Interim Compilation of Stream Gauging Data, 1979

Project WS I.I

August 1980

L-63

Alberta
ENVIRONMENT

15th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta, Canada
T5K 2J6

ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

RESEARCH REPORTS

hese research reports describe the results of investigations funded under the Alberta Oil Sands Environmental Research Program. This program was designed to direct and co-ordinate research projects concerned with the environmental effects of development of the Athabasca Oil Sands in Alberta.

A list of research reports published to date is included at the end of this report.

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Research Management Division
15th Floor, Oxbridge Place
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(403) 427-3943

Interim Compilation of Stream Gauging Data, 1979

Project WS 1.1

This report may be cited as:

Thorson, K.M. 1980. Interim compilation of stream gauging data, 1979. Prep. for Alberta Oil Sands Environmental Research Program by Environment Canada. AOSERP Project WS 1.1. 63 pp.

The Hon. J.W. (Jack) Cookson
Minister of the Environment
222 Legislative Building
Edmonton, Alberta

Sir:

Enclosed is the report "Interim Compilation of Stream Gauging Data, 1979".

This report was prepared for the Alberta Oil Sands Environmental Research Program, through its Water System, under the Canada-Alberta Agreement of February 1975 (amended September 1977).

Respectfully,

W. Solodzuk, P.Eng.
Chairman, Steering Committee, AOSERP
Deputy Minister, Alberta Environment

INTERIM COMPILATION OF STREAM GAUGING DATA, 1979

DESCRIPTIVE SUMMARY

This project continues the provision of adequate hydrometric information from the AOSERP study area by Water Survey of Canada through the operation of a gauging network. In 1979 this network comprised 20 stations. For background information on the inception of the hydrometric program and the methodology employed, the reader is referred to previous AOSERP reports: "Interim Compilation of Stream Gauging Data to December 1976 for the Alberta Oil Sands Environmental Research Program" and "Interim Compilation of Stream Gauging Data, 1977".

The Alberta Oil Sands Environmental Research Program accepts this report as a useful contribution and thanks Water Survey of Canada and the author for their efforts.

W.R. MacDonald

W.R. MacDonald, Ph.D
Director (1980-81)
Alberta Oil Sands Environmental
Research Program

INTERIM COMPILATION OF STREAM GAUGING DATA, 1979

by

K.M. THORSON

Water Survey of Canada
Environment Canada

for

ALBERTA OIL SANDS ENVIRONMENTAL
RESEARCH PROGRAM

Project WS 1.1

August 1980

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ABSTRACT

The present report is an update of the previous report, "Interim Compilation of Stream Gauging Data, 1978" (Project HY 1.1), and contains all available hydrometric data for the study area (Figure 1) for the 1979 calendar year. Presented are daily discharges for streamflow stations with corresponding hydrographs and stage-discharge curves and water level information for gauged lakes.

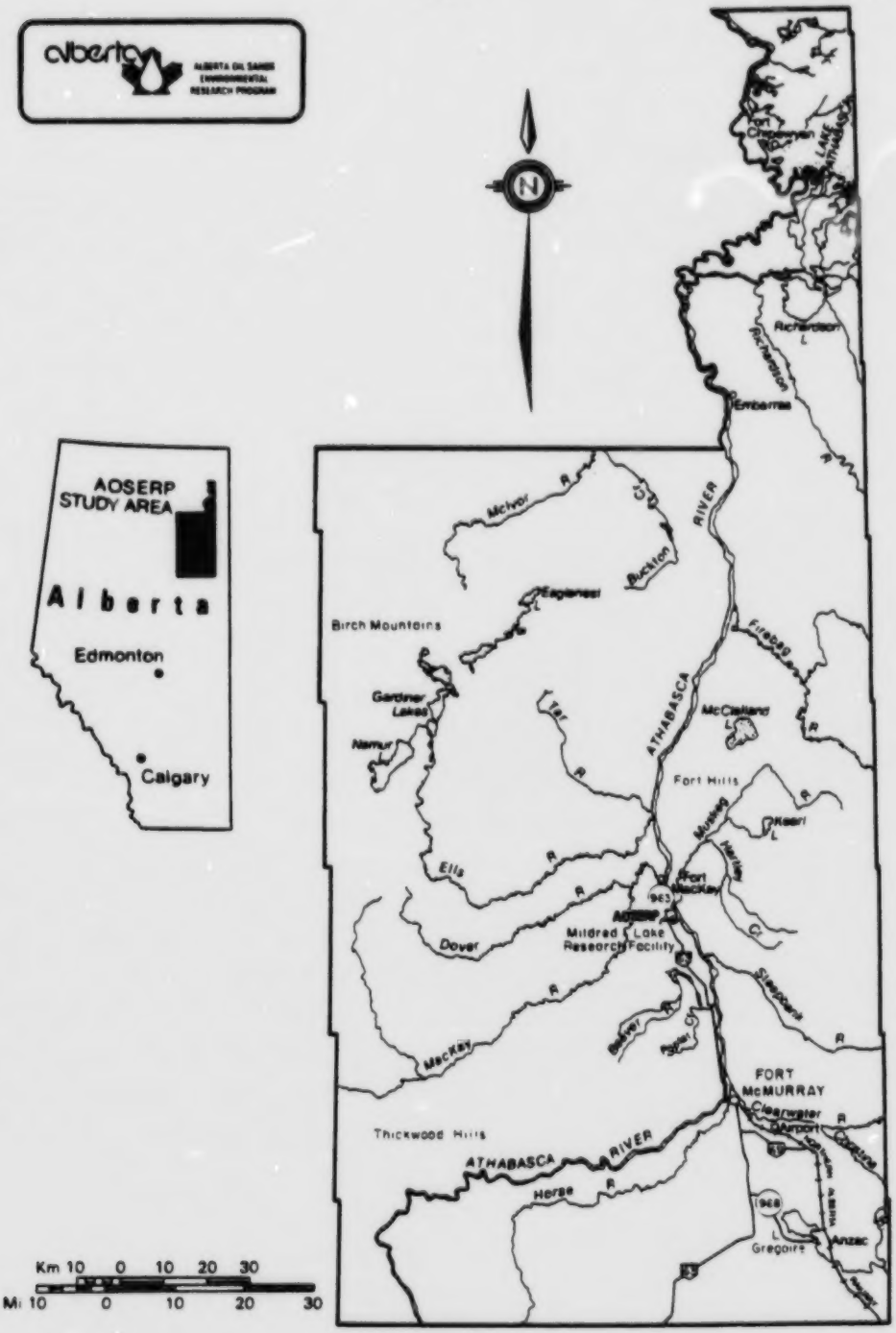


Figure 1. The AOSERP study area.

ACKNOWLEDGEMENTS

This research project WS 1.1 was partially funded by the Alberta Oil Sands Environmental Research Program, a research program established to fund, direct, and co-ordinate environmental research in the Athabasca Oil Sands area of northeastern Alberta.

1. INTRODUCTION

This 1979 compilation report contains all available hydrometric data in the study area for the 1979 calendar year. Data are presented for 19 streamflow stations and one lake station.

Since the present report is intended as an update to a previous report, "Interim Compilation of Stream Gauging Data, 1977" (Warner and Spitzer 1979), the reader is referred to the report and its introductory portion which details Water Survey of Canada's involvement in the study area and some background concerning the inception of the program. As well, information is given regarding data collection techniques, methodology, and instrumentation and problems encountered in the area. A listing of hydrometric reference work is also included. A compilation report for 1978 data has previously been prepared and is of a similar format to this report "Interim Compilation of Stream Gauging Data, 1978" (Warner 1979).

Table 1 lists the gauging stations operated in the study area for 1979 and provides details as to drainage areas and period of record. The locations of all stations, plotted according to Water Survey of Canada station numbers, are shown on Figure 2.

The Appendix to this report contains the data organized in station name alphabetical order. A description of each station precedes the hydrometric data and includes the station name, number, location, drainage area, period of available record, site description and instrumentation, and general comments concerning the quality of the record and any problems encountered.

Following the description is a graph of the latest stage-discharge relationship with individual streamflow measurements plotted to give some indication of scatter or accuracy. Following the stage-discharge curves are the available daily mean discharges with the corresponding hydrographs for streamflow stations and the available daily mean water levels for lake stations.

Table 1. List of Water Survey of Canada gauging stations operated during 1979.

STATION NUMBER	STATION	DRAINAGE AREA km^2	GAUGE	YEAR STATION ESTAB.
07DD001	ATHABASCA RIVER AT EMBARRAS AIRPORT	155 000	R[a]	1959
07DA001	ATHABASCA RIVER BELOW McMURRAY	133 000	R	1957
07CD005	CLEARWATER RIVER ABOVE CHRISTINA RIVER	17 200	R	1966
07CD001	CLEARWATER RIVER AT DRAPER	30 600	R	1957
07DB003	DUNKIRK RIVER NEAR FORT MacKAY	1 580	R	1975
07DA010	ELLS RIVER BELOW GARDINER LAKES	1 360	R	1975
07DA017	ELLS RIVER NEAR THE MOUTH	2 476	R	1975
07DC001	FIREBAG RIVER NEAR THE MOUTH	6 030	R	1971
07CE001	GREGOIRE LAKE NEAR FORT McMURRAY		R	1969
07CD004	HANGINGSTONE RIVER AT McMURRAY	914	M[b]	1965
07DA009	HARTLEY CREEK NEAR FORT MacKAY	368	R	1975
07CC001	HORSE RIVER AT ABASANDS PARK	2 180	R	1976
07DA016	JOSLYN CREEK NEAR FORT MacKAY	248	R	1975
07DB001	MacKAY RIVER NEAR FORT MacKAY	5 230	R	1972
07DA008	MUSKEG RIVER NEAR FORT MacKAY	1 460	R	1974
07DA007	POPLAR CREEK NEAR FORT McMURRAY	151	R	1972
07DA002	RICHARDSON RIVER NEAR THE MOUTH	2 950	R	1970
07DA006	STEEPBANK RIVER NEAR FORT McMURRAY	1 370	R	1972
07DA001	UNNAMED CREEK NEAR FORT MacKAY	280	R	1975

[a] R - Recording.

[b] M - Manual.

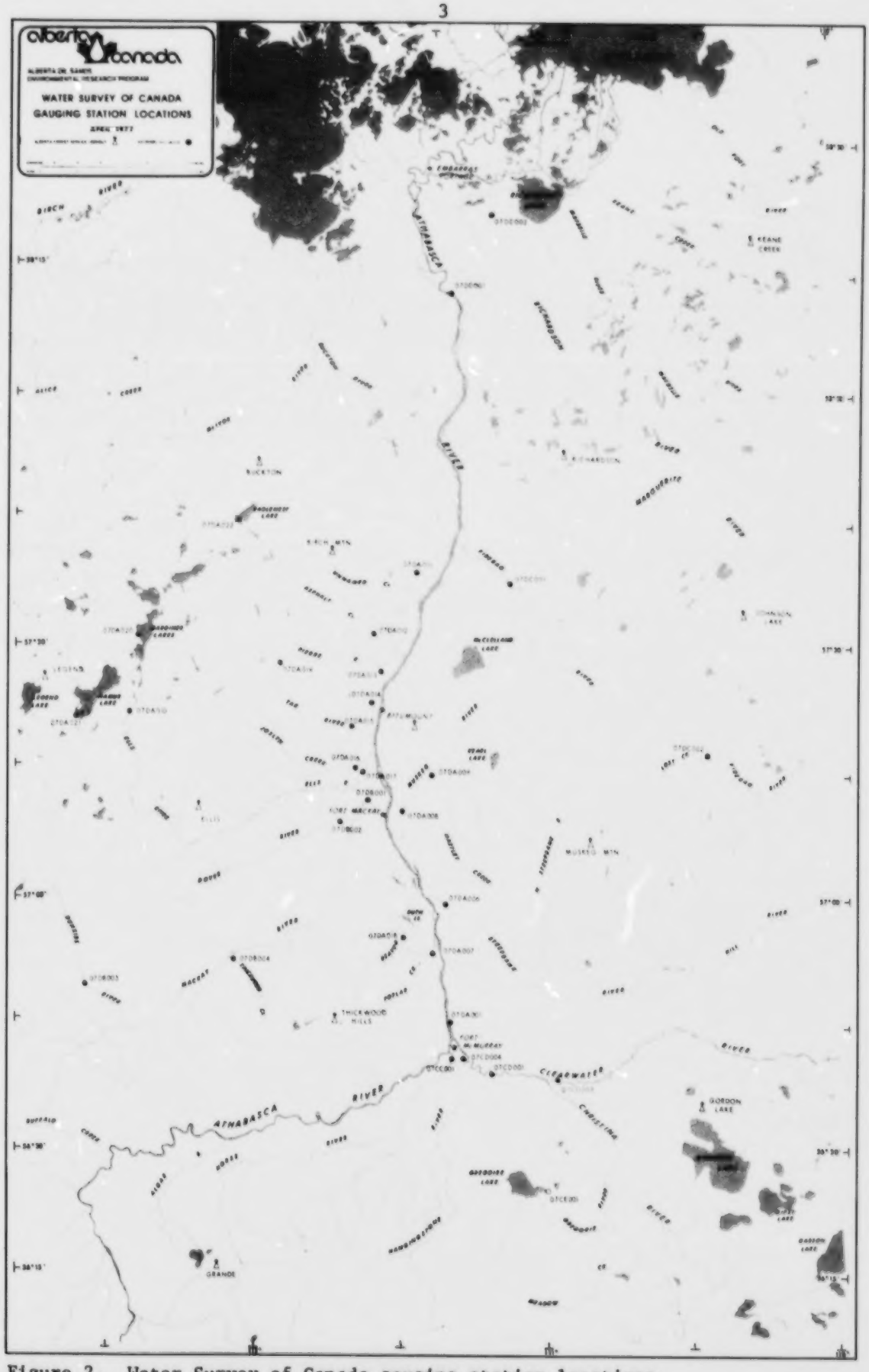


Figure 2. Water Survey of Canada gauging station locations.

2. REFERENCES CITED

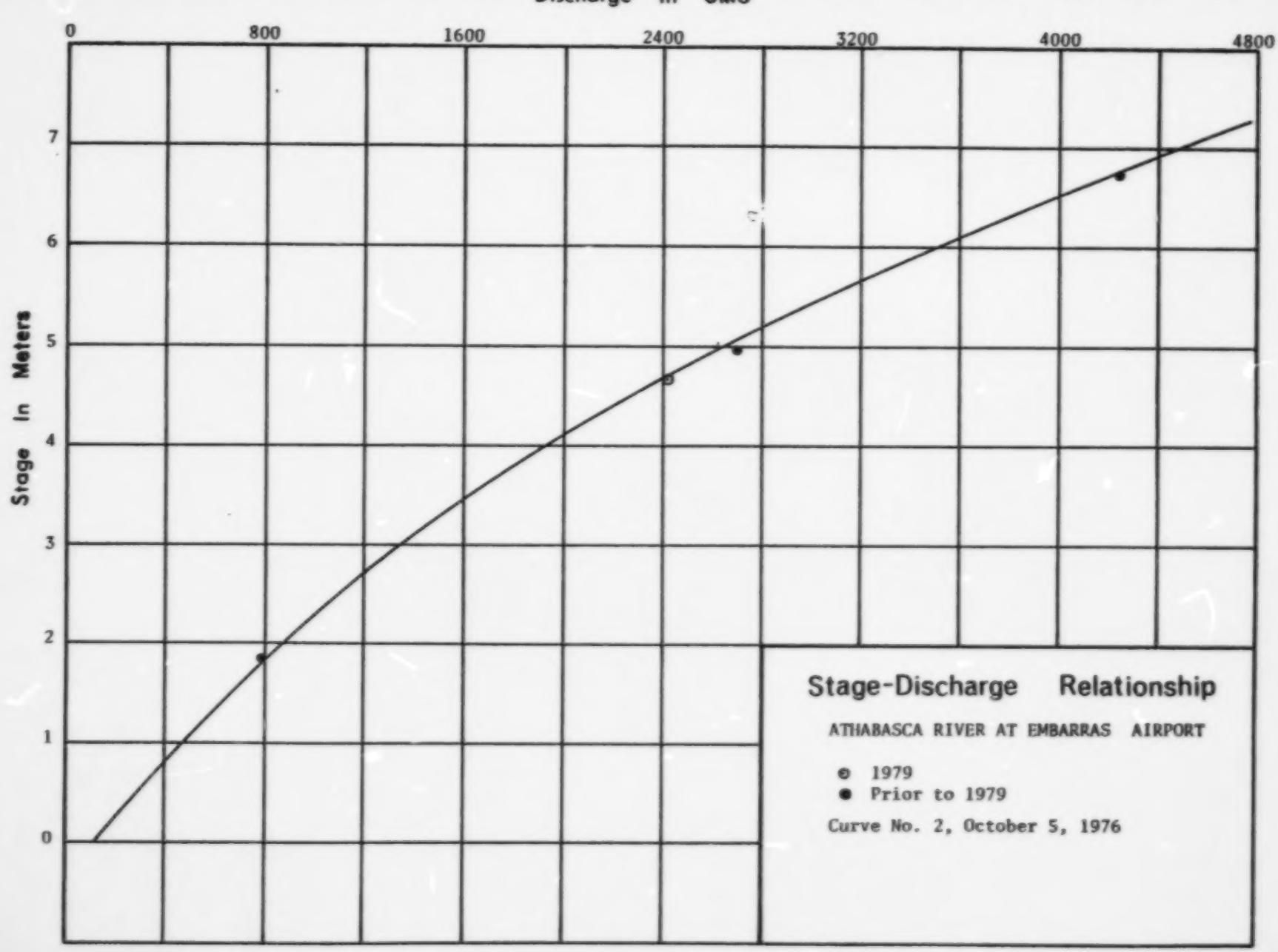
Warner, L.A., and M.O. Spitzer. 1979. Interim compilation of stream gauging data, 1977. Prep. for the Alberta Oil Sands Environmental Research Program by Environment Canada. AOSERP Project WS 1.1. 64 pp.

Warner, L.A. 1979. Interim compilation of stream gauging data, 1978. Prep. for the Alberta Oil Sands Environmental Research Program by Environment Canada. AOSERP Project WS 1.1. 68 pp.

3. APPENDIX

3.1

STATION NAME:	Athabasca River at Embarras Airport
STATION NUMBER:	07DD001
LOCATION:	Latitude 58°12'18", Longitude 111°23'24", NE 15-106-09-W4
DRAINAGE AREA:	59 800 square miles (155 000 km^2)
PERIOD OF RECORD:	Discharge records are available on a more-or-less continuous basis from May 1971 to November 5 1976, and open water seasons 1977 to 1979.
SITE DESCRIPTION:	The gauge is located on a high sand bank on the right side of the river close to a saw-mill power house. This is indicated as Mile 119 on the Athabasca River navigation charts. The station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. The open water discharge measurements prior to June 1974 were made at Mile 123; since then they have been made several hundred feet (30 - 100 m) above the gauge.
GENERAL:	The stage discharge curve has been well defined throughout the range of stage and appears to be quite stable, especially at the higher stages.


Discharge In CMS
0
800
1600
2400
3200
4000
4800
Stage In Meters
0
1
2
3
4
5
6
7
Stage-Discharge Relationship
ATHABASCA RIVER AT EMBARRAS AIRPORT
1979
Prior to 1979
Curve No. 2, October 5, 1976

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ATHABASCA RIVER AT EMBARRAS AIRPORT

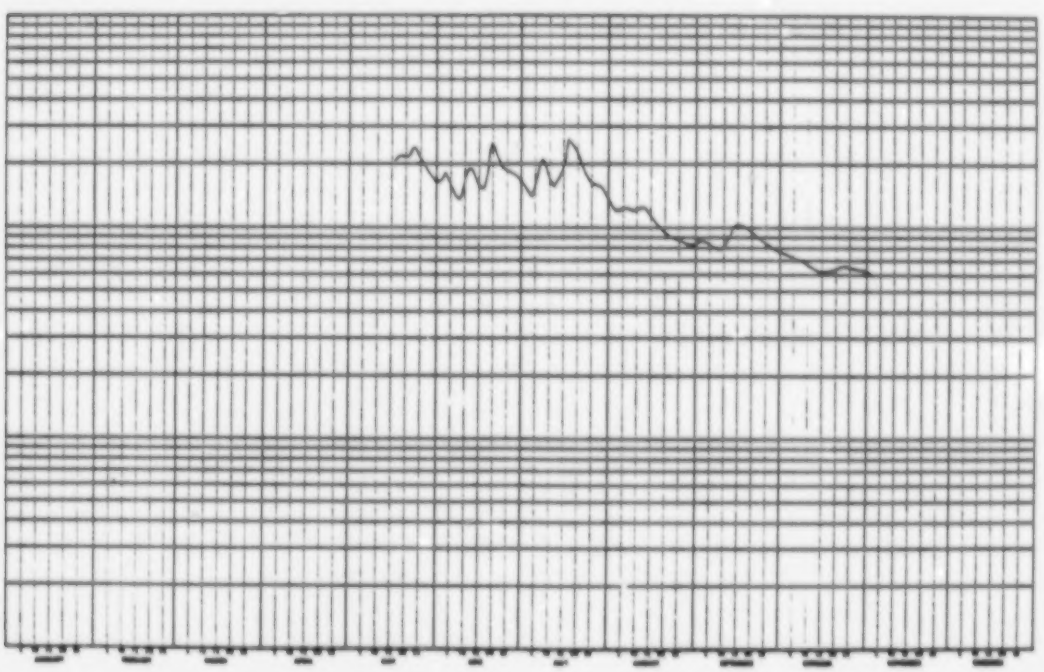
STATION NO. 07DD001

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1						1660	1600	1290	859	770	619		1
2						1710	1510	1230	841	746	601		2
3						1820	1460	1210	873	748	594		3
4						1730	1410	1230	855	734			4
5						1580	1480	1260	828	728			5
6						1450	1730	1260	812	714			6
7						1380	2070	1240	805	706			7
8						1370	2140	1220	808	705			8
9						1430	1930	1210	798	688			9
10						1660	1740	1230	805	683			10
11						1860	1680	1250	833	648			11
12						1910	1570	1270	894	661			12
13						1810	1480	1260	871	620			13
14						1690	1750	1210	1010	615			14
15						1990	1840	1160	1030	611			15
16					2070 A	1920	2160	1110	1030	610			16
17					2160	1920	2610	1070	1020	615			17
18					2190	1750	2570	1030	1020	623			18
19					2180	2030	2060	994	1000	633			19
20					2150	2520	2350	971	976	633			20
21					2170	2350	2110	937	942	641			21
22					2370	2140	1930	906	909	652			22
23					2040 A	1980	1780	892	883	651			23
24					2300	1890	1690	886	862	651			24
25					2160	1860	1650	886	849	648			25
26					2060	1860	1610	867	838	648			26
27					1930	1820	1600	855	813	644			27
28					1820	1790	1600	836	796	638			28
29					1720	1740	1550	826	790	636			29
30					1660	1670	1470	832	770	632			30
31					1650		1370	848		627			31
TOTAL						53510	55960	33260	26532	20543			TOTAL
MEAN						1780	1800	1072	884	663			MEAN
CMS						4.920000	4.830000	2.870000	2.290000	1.770000			CMS
MAX						2520	2610	1290	1030	770			MAX
MIN						1370	1370	826	770	610			MIN

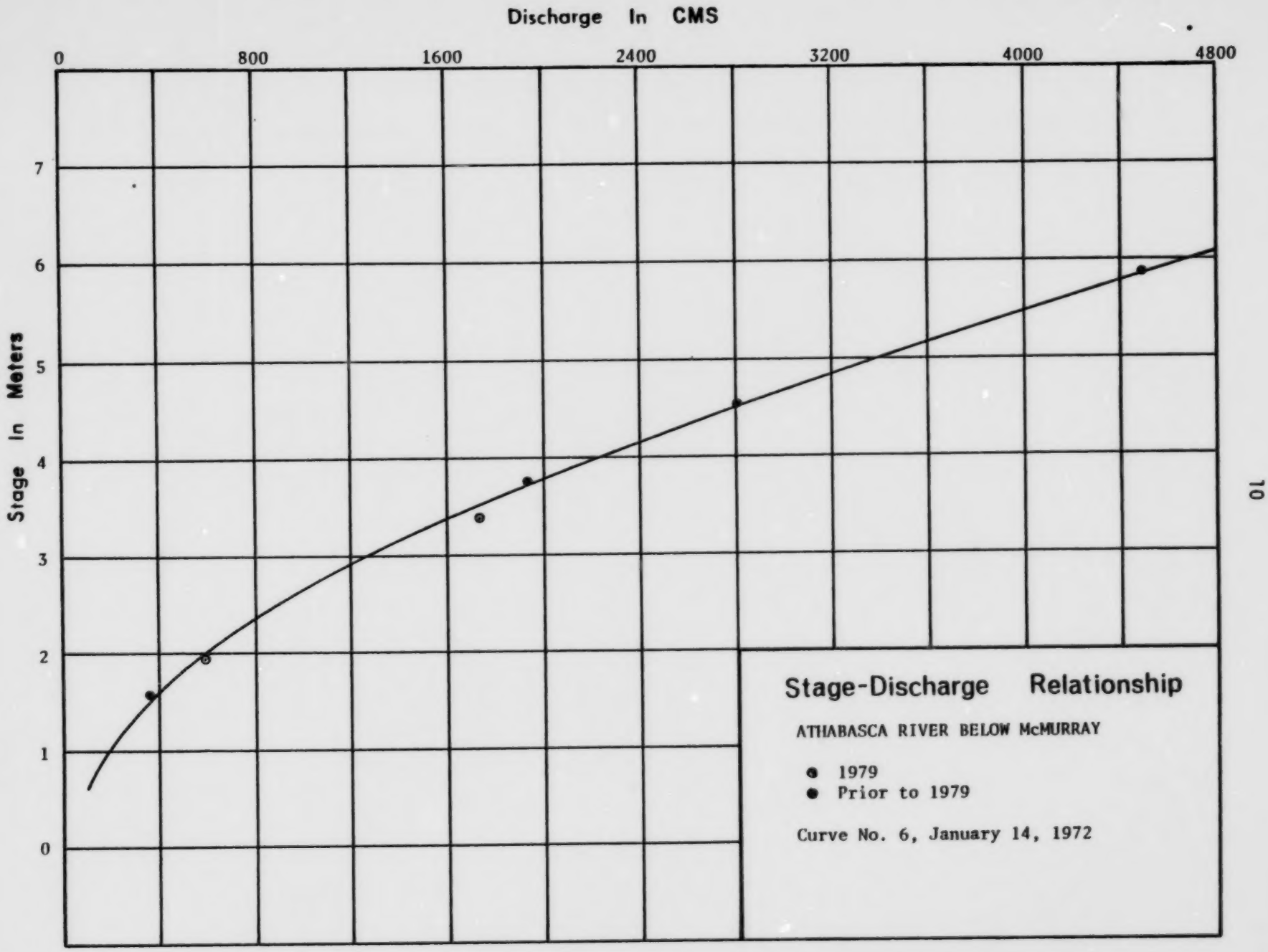
A-MANUAL GAUGE

MAXIMUM INSTANTANEOUS DISCHARGE: 2720 M3/S AT 1915 HR July 17



3.2

STATION NAME:	Athabasca River below Fort McMurray
STATION NUMBER:	07DA001
LOCATION:	Latitude 56°46'50", Longitude 111°24'00", NW 05-90-09-W4
DRAINAGE AREA:	51 300 square miles (133 000 km^2)
PERIOD OF RECORD:	Discharge data are available from October 1957 to December 1979
SITE DESCRIPTION:	The gauge is located on the right bank on top of a limestone cliff, about 600 feet (180 m) above Clark Creek at Mile 6.5 on the Athabasca River as indicated by navigation charts. It is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water measurements are made by boat about one-half mile (0.8 km) below the gauge.
GENERAL:	Data for 1979 are considered reliable as the stage-discharge relationship continues to remain reasonably stable.


Discharge In CMS
0
800
1600
2400
3200
4000
4800
Stage In Meters
7
6
5
4
3
2
1
0
Stage-Discharge Relationship
ATHABASCA RIVER BELOW McMURRAY
1979
Prior to 1979
Curve No. 6, January 14, 1972

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ATHABASCA RIVER BELOW MCMURRAY

STATION NO. 07DA001

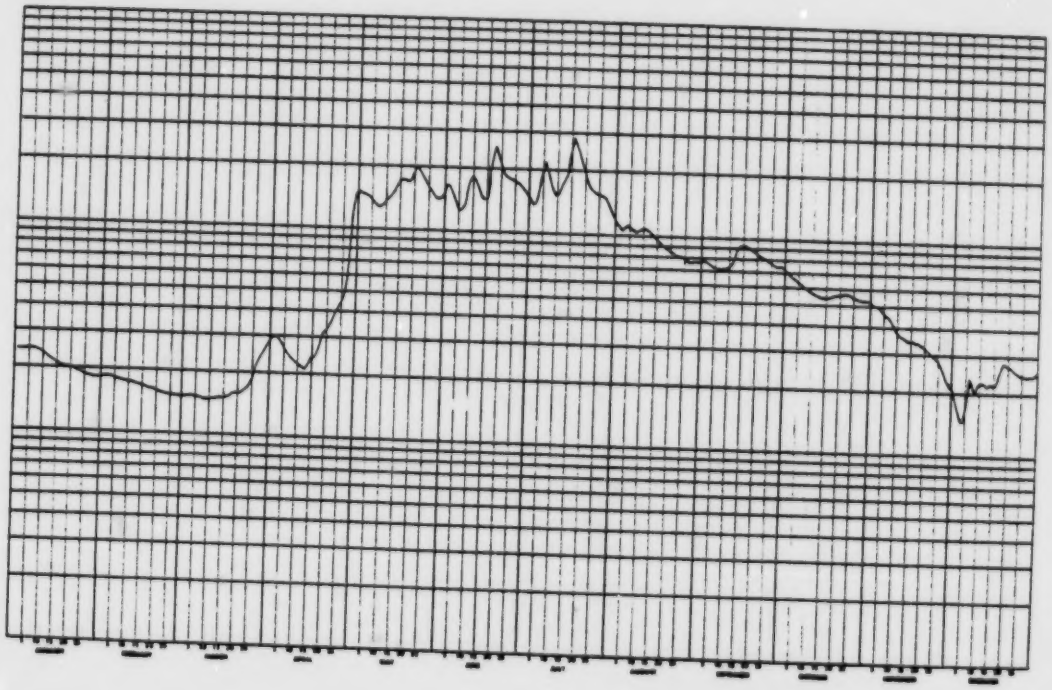
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	246 B	183 B	152 B	296 B	1500 B	1660	1830	1150 E	790 E	720 E	504	295 B	1
2	243 B	184 B	152 B	301 B	1480 B	1650	1780	1100 E	790 E	700 E	501	183 B	2
3	240 B	181 B	152 B	295 B	1460 B	1640	1380	1080 E	760 E	680 E	503 B	159 B	3
4	245 B	182 B	152 B	283 B	1440 B	1490	1420	1080 E	750 E	660 E	491 B	147 B	4
5	246 B	180 B	151 B	266 B	1400 B	1360	1610	1120 E	750 E	660 E	473 B	149 B	5
6	248 B	179 B	151 B	254 B	1350 B	1260	2210	1100 E	730 E	630 E	457 B	183 B	6
7	243 B	178 B	150 B	242 B	1300 B	1300	2000	1070 E	720 E	620 E	449 B	235 B	7
8	242 B	175 B	149 B	235 B	1280 B	1480	1760	1050 E	720 E	680 E	433 B	206 B	8
9	240 B	174 B	148 B	230 B	1310 B	1770	1610	1070 E	729 E	590 E	422 B	197 B	9
10	235 B	174 B	148 B	225 E	1360 B	1960	1580	1090 E	730 E	580 E	383 B	214 B	10
11	231 B	173 B	149 B	218 B	1410 B	1810	1580	1110 E	780 E	570 E	370 B	221 B	11
12	223 B	171 B	150 B	213 B	1430	1670	1710	1090 E	780 E	560 E	360 B	222 B	12
13	216 B	171 B	150 B	211 B	1490	1560	1800	1050 E	870 E	550 E	360 B	214 B	13
14	216 B	170 B	151 B	224 B	1600	1670	1930	1020 E	920 E	540 E	350 B	221 B	14
15	210 B	168 B	152 B	242 B	1710	1650	2540	990 E	930 E	540 E	350 B	220 B	15
16	208 B	166 B	152 B	241 B	1750	1510	2980	960 E	900 E	540 E	350 B	215 B	16
17	207 B	165 B	154 B	253 B	1750	2200	2720	930 E	930 E	550 E	340 B	225 B	17
18	203 B	163 B	158 B	280 B	1710	2680	2800	910 E	910 E	560 E	340 B	254 B	18
19	204 B	162 B	160 B	319 B	1700	2680	2170	890 E	890 E	560 E	330 B	270 B	19
20	202 B	160 B	159 B	329 B	1870	2170	1950	870 E	870 E	570 E	330 B	275 B	20
21	199 B	157 B	159 B	332 B	2060	1970	1780	850 E	850 E	570 E	320 B	270 B	21
22	196 B	157 B	163 B	357 B	1970	1860	1680	830 E	840 E	570 E	310 B	262 B	22
23	194 B	156 B	170 B	391 B	1850	1820	1620	820 E	820 E	570	300 B	257 B	23
24	193 B	155 B	177 B	409 B	1780	1800	1590	813 A	810 E	569	298 B	251 B	24
25	190 B	154 B	185 B	428 B	1640	1780	1580	804	790 E	557	289 B	247 B	25
26	187 B	153 B	211 B	488 B	1560	1760	1580	785	780 E	550	278 B	240 B	26
27	185 B	152 B	228 B	578 B	1480	1730	1560	773	755 A	542	255 B	240 B	27
28	185 B	152 B	238 B	850 B	1420	1660	1580	770 E	755	538	244 B	240 B	28
29	184 B		252 B	1300 B	1420	1600	1390	780 E	754 A	533	215 B	240 B	29
30	184 B		269 B	1480 B	1460	1530	1290	780 E	750 E	527	220 B	243 B	30
31	184 B		284 B		1510		1220 A	780 E		516		249 B	31
TOTAL	6631	4697	5376	11780	48390	51850	55440	29575	24134	18810	10697	6962	TOTAL
MEAN	214	168	173	393	1560	1720	1790	954	804	581	360	225	MEAN
DAM3	573000	406000	464000	1020000	4180000	4450000	4790000	2560000	2090000	1580000	934000	602000	DAM3
MAX	246	184	284	1480	2060	2680	2980	1150	930	720	504	278	MAX
MIN	184	152	148	211	1280	1260	1220	770	720	516	215	147	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, 749 M3/S
TOTAL DISCHARGE, 23600000 DAM3
MAXIMUM DAILY DISCHARGE, 2980 M3/S ON JUL 14
MINIMUM DAILY DISCHARGE, 147 M3/S ON DEC 4

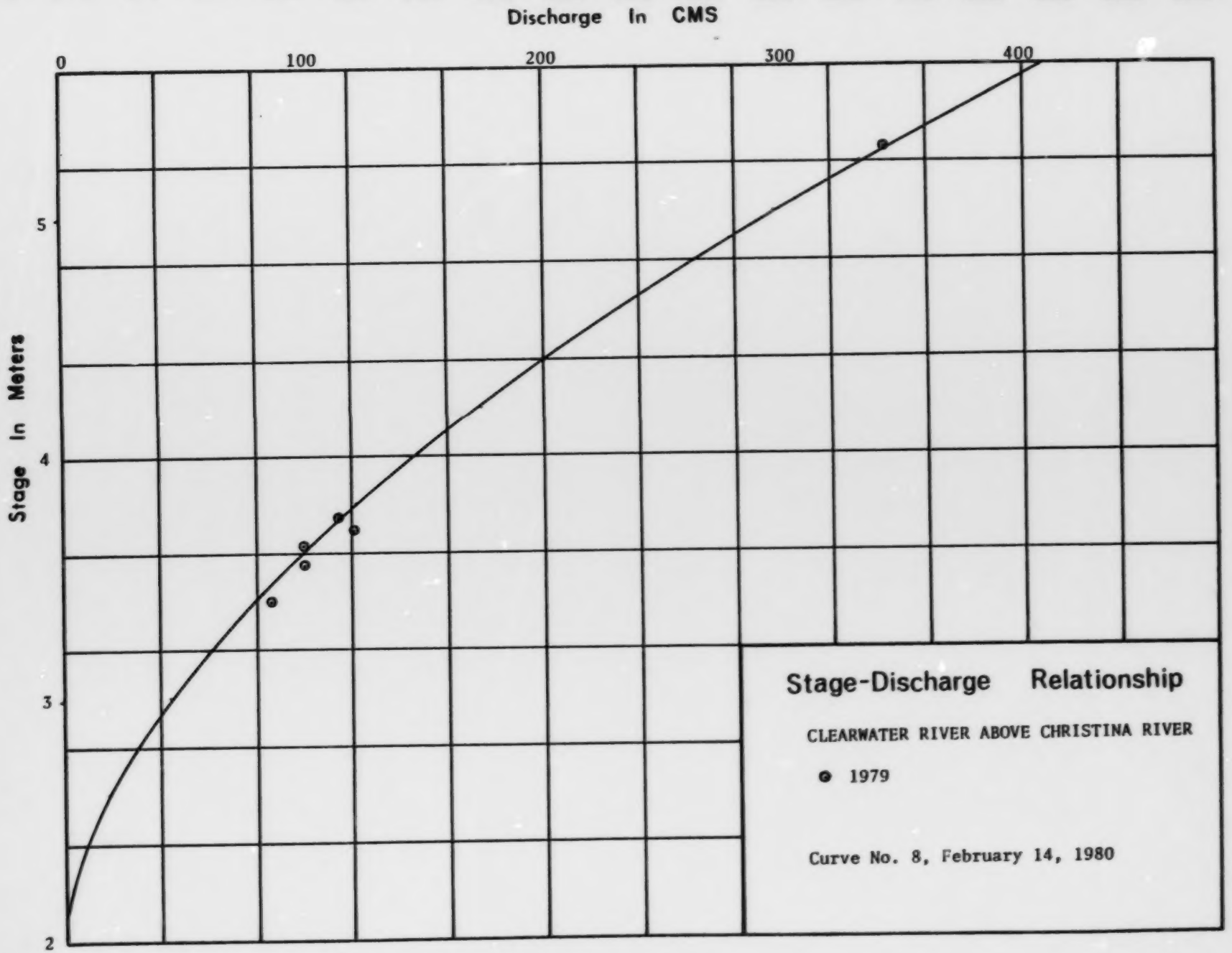
MAXIMUM INSTANTANEOUS DISCHARGE, 2930 M3/S AT 2350 ON July 16

A=MANUAL GAUGE
B=ICE CONDITIONS
E=ESTIMATED



3.3

STATION NAME:	Clearwater River above Christina River (present site)
STATION NUMBER:	07CD005
LOCATION:	Latitude 56°39'40", Longitude 110°55'40"
DRAINAGE AREA:	6 630 square miles (17 200 km^2)
PERIOD OF RECORD:	This station was moved to its present site on September 25 1975 and discharge data are available at this site to December 1979.
SITE DESCRIPTION:	The present location is on the right bank approximately five miles (8 km) above the confluence with the Christina River and about 20 miles (32 km) upstream of Fort McMurray. The station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made by boat about 300 feet (90 M) above the gauge.
GENERAL:	A new curve was drawn for the 1978 stage-discharge relationship to account for a slight shift in the medium to high flow range. This curve was used for 1979.


Discharge In CMS
0
100
200
300
400
Stage In Meters
2
3
4
5
Stage-Discharge Relationship
CLEARWATER RIVER ABOVE CHRISTINA RIVER
1979
Curve No. 8, February 14, 1980

STATION NO. 07CD005

CLEARWATER RIVER ABOVE CHRISTINA RIVER

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(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

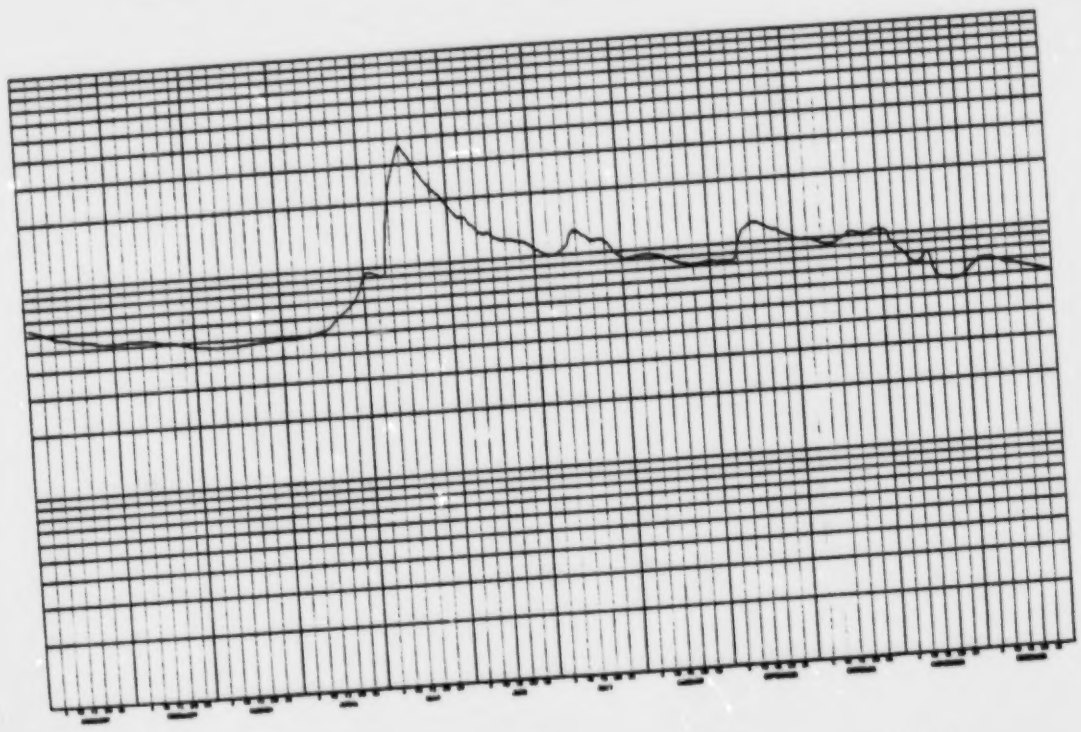
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	63.7 B	52.2 B	47.0 B	48.0 B	95.0 B	188	107	91.2	84.3	101	103	63.5 B	1
2	62.9 B	52.2 B	47.2 B	48.0 B	94.0 B	173	104	91.2	83.9	100	102	67.5 B	2
3	62.1 B	52.2 B	47.2 B	49.1 B	93.0 B	167	102	92.6	83.5	99.5	91.0 B	70.0 B	3
4	61.3 B	52.3 B	47.0 B	49.1 B	92.0 B	161	101	93.4	83.2	99.0	88.0 B	70.0 B	4
5	60.5 B	52.4 B	46.8 B	49.2 B	91.0 B	160	101	93.3	83.0	98.6	88.0 B	71.0 B	5
6	59.8 B	52.6 B	46.6 B	49.3 B	90.0 B	160	100	93.5	83.2	98.0	85.0 B	71.5 B	6
7	59.1 B	52.8 B	46.5 B	49.4 B	89.0 B	156	98.1	94.9	82.5	97.1	83.0 B	71.5 B	7
8	58.4 B	53.2 B	46.4 B	49.6 B	88.0 B	153	99.1	95.6	82.1	95.6	80.0 B	71.0 B	8
9	57.7 B	53.1 B	46.5 B	49.8 B	98.0 B	148	98.1	96.3	84.8	94.5	78.5 B	70.5 B	9
10	57.0 B	53.0 B	46.6 B	50.0 B	185	144	107	92.5	83.9	94.1	75.0 B	70.0 B	10
11	56.7 B	52.7 B	46.7 B	50.3 B	252	135	100	93.3	109	92.6	73.0 B	69.0 B	11
12	56.4 B	52.4 B	46.8 B	50.6 B	273	133	115	93.5	114	91.5	71.5 B	68.5 B	12
13	56.1 B	52.1 B	47.0 B	50.9 B	311	132	129	92.3	119	90.9	70.0 B	68.0 B	13
14	55.8 B	51.8 B	47.1 B	51.2 B	348	132	131	91.8	122	90.1	73.0 B	67.8 B	14
15	55.5 B	51.5 B	47.1 B	51.5 B	365	131	130	91.1	123	91.9	76.0 B	67.5 B	15
16	55.2 B	51.2 B	47.2 B	52.0 B	366	129	128	89.6	123	94.5	81.0 B	67.0 B	16
17	54.9 B	50.9 B	47.2 B	53.0 B	367	127	126	88.1	122	97.9	79.5 B	66.5 B	17
18	54.7 B	50.6 B	47.3 B	54.0 B	327	125	121	86.9	121	101	78.0 B	66.0 B	18
19	54.5 B	50.3 B	47.5 B	55.0 B	313	123	118	85.7	120	103	81.5 B	65.5 B	19
20	54.3 B	50.0 B	47.8 B	57.0 B	295	120	115	84.1	118	104	84.5 B	65.0 B	20
21	54.0 B	49.7 B	47.9 B	58.0 B	276	123	113	83.2	116	104	90.5 B	64.5 B	21
22	53.8 B	49.3 B	47.9 B	62.0 B	261	122	115	83.6	116	103	99.1 B	64.0 B	22
23	53.6 B	49.0 B	48.0 B	64.0 B	249	121	116	82.8	113	102	98.7 B	63.5 B	23
24	53.3 B	48.7 B	48.0 B	66.0 B	241	120	114	81.8	112	101	98.4 B	63.0 B	24
25	53.0 B	48.4 B	48.1 B	68.0 B	234	119	111	80.7	110	100	98.0 B	62.5 B	25
26	52.7 B	48.1 B	48.1 B	69.0 B	225	119	108	80.6	109	101	97.5 B	61.8 B	26
27	52.3 B	48.2 B	48.1 B	71.0 B	219	118	106	80.8	108	102	98.5 B	61.1 B	27
28	52.0 B	48.0 B	48.1 B	77.0 B	211	115	108	82.6	106	100	99.5 B	60.5 B	28
29	52.1 B		48.1 B	87.0 B	203	112	96.7	83.3	103	105	98.5 B	60.0 B	29
30	52.2 B		48.5 B	93.0 B	194	110	96.5	84.0	102	104	91.5 B	59.5 B	30
31	52.3 B		48.7 B		187		92.1	84.3		104		59.0 B	31
TOTAL	1737.0	1429.2	1469.8	1748.6	6787.0	4058	3607.5	2788.0	3128.2	3067.7	2182.2	2062.7	TOTAL
MEAN	56.1	51.0	47.4	58.3	219	135	119	89.9	104	99.0	72.7	65.9	MEAN
DAM3	150000	123000	127000	150000	583000	351000	298000	237000	270000	265000	189000	176000	DAM3
MAX	63.7	53.2	48.7	93.0	366	160	131	96.3	123	109	103	71.5	MAX
MIN	52.0	48.0	46.4	48.0	89.0	119	92.1	83.0	82.1	98.1	57.5	59.0	MIN

B-ICE CONDITIONS

SUMMARY FOR THE MONTHS JAN TO DEC

MEAN DISCHARGE, 92.4 M3/S
TOTAL DISCHARGE, 2920000 DAM3
MAXIMUM DAILY DISCHARGE, 366 M3/S ON MAY 16
MINIMUM DAILY DISCHARGE, 46.4 M3/S ON MAR 8

MAXIMUM INSTANTANEOUS DISCHARGE, 369 M3/S AT 1645 ON May 15



3.4

STATION NAME: Clearwater River at Draper

STATION NUMBER: 07CD001

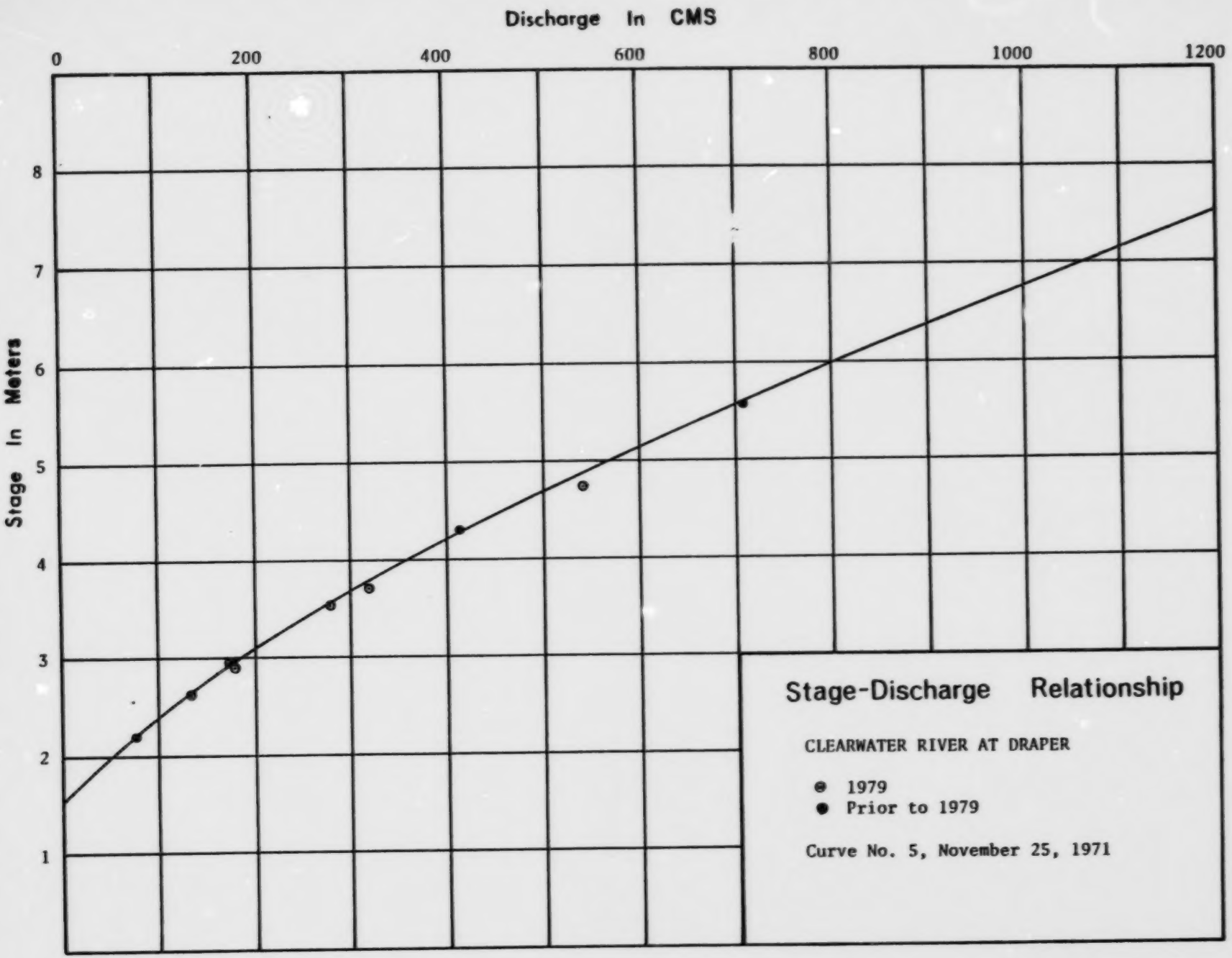
LOCATION: Latitutde 56°40'50", Longitude 110°55'40", NW 32-88-08-W4

DRAINAGE AREA: 11 800 square miles (30 600 km^2)

PERIOD OF RECORD: This station was established on August 22 1957. Discharge data are available on a continuous basis to December 1979.

SITE DESCRIPTION: The gauge is located on the left bank about ten miles (16 km) above the confluence with the Athabasca River. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made from the cableway one-half mile (0.8 km) below the gauge.

GENERAL: The stage-discharge relationship has remained relatively stable for the entire period of record.


Discharge In CMS
0
200
400
600
800
1000
1200
Stage In Meters
1
2
3
4
5
6
7
8
Stage-Discharge Relationship
CLEARWATER RIVER AT DRAPER
1979
Prior to 1979
Curve No. 5, November 25, 1971

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CLEARWATER RIVER AT DRAPER

STATION NO. 07CD001

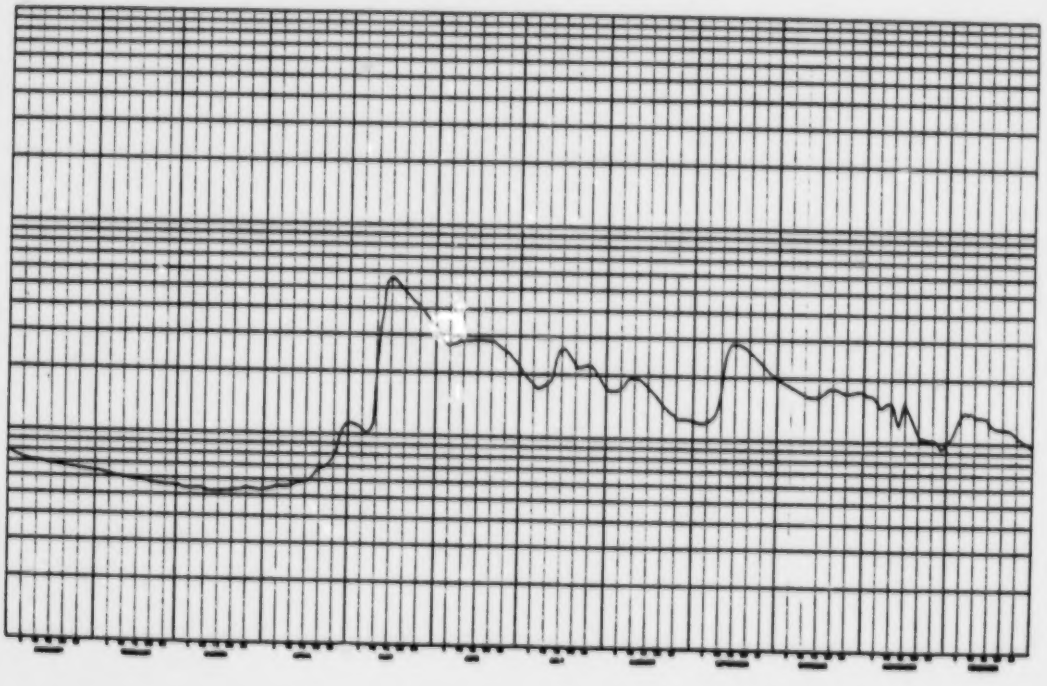
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	77.5 B	60.2 B	55.8 B	58.1 B	115 B	306	209	149	122	193	148	101 B	1
2	76.4 B	60.0 B	56.6 B	58.3 B	116 B	295	201	147	121	190	145 B	106 B	2
3	75.8 B	63.7 B	56.6 B	56.8 B	112 B	283	193	144	119	186	147 B	116 B	3
4	76.7 B	63.1 B	56.7 B	55.6 B	110 B	273	187	149	119	184	163 B	123 B	4
5	73.6 B	62.5 B	56.8 B	56.0 B	106 B	269	182	170	121	180	157 B	130 B	5
6	73.0 B	62.0 B	56.4 B	56.0 B	103 B	272	179	174	122	179	146 B	137 B	6
7	72.4 B	61.7 B	56.0 B	56.5 B	102 B	272	171	181	126	175	144 B	140 B	7
8	71.3 B	61.6 B	55.1 B	56.5 B	105 B	277	171	190	138	172	150 B	137 B	8
9	71.0 B	60.8 B	54.6 B	57.0 B	111 B	285	177	194	139	168	153 B	140 B	9
10	70.7 B	60.6 B	53.8 B	57.2 B	196 B	287	179	193	148	167	154 B	137 B	10
11	70.5 B	60.3 B	53.0 B	57.6 B	289	284	181	193	213	166	156 B	132 B	11
12	70.2 B	60.0 B	52.7 B	58.4 B	341	284	190	191	253	162	128 B	132 B	12
13	69.6 B	59.7 B	52.6 B	59.0 B	435	286	224	187	276	161	128 B	133 B	13
14	69.0 B	59.4 B	52.7 B	59.5 B	525	287	246	183	285	160	133 B	132 B	14
15	69.1 B	59.0 B	52.7 B	59.3 B	557	289	259	177	287	163	155 B	129 B	15
16	68.8 B	59.1 B	53.1 B	59.8 B	559	289	265	171	285	167	148 B	123 B	16
17	68.5 B	58.6 B	53.3 B	61.6 B	562	288	268	165	281	171	133 B	120 B	17
18	68.2 B	58.0 B	53.0 B	65.0 B	528	286	269	160	276	174	127 B	118 B	18
19	67.9 B	57.6 B	53.7 B	67.2 B	518	284	257	156	270	177	118 B	117 B	19
20	67.9 B	57.1 B	53.8 B	68.3 B	498	287	224	148	264	178	106 B	117 B	20
21	67.6 B	56.9 B	53.7 B	69.3 B	469	284	216	142	257	177	103 B	117 B	21
22	67.6 B	56.6 B	53.7 B	69.6 B	452	277	215	138	249	176	105 B	117 B	22
23	67.1 B	56.6 B	54.0 B	71.6 B	437	270	218	136	242	172	102 B	116 B	23
24	66.8 B	56.6 B	55.2 B	74.8 B	428	263	220	138	236	170	102 B	116 B	24
25	66.5 B	56.3 B	55.1 B	77.5 B	414	256	223	127	228	168	103 B	111 B	25
26	66.2 B	56.3 B	54.7 B	88.1 B	402	252	222	124	220	169	103 B	107 B	26
27	65.9 B	56.0 B	54.3 B	96.0 B	389	245	213	126	212	170	100 B	105 B	27
28	65.7 B	56.0 B	54.2 B	106 B	374	237	202	126	206	172	96.6 B	103 B	28
29	65.1 B		54.1 B	110 B	356	226	191	126	201	170	93.2 B	101 B	29
30	64.8 B		53.7 B	114 B	338	219	182	125	196	174	97.7 B	99.4 B	30
31	64.5 B		53.8 B		323		174	124		171		97.2 B	31
TOTAL	2154.6	1668.3	1674.2	2067.4	10240	8218	6656	4926	6224	5362	3898.5	3788.6	TOTAL
MEAN	69.5	59.6	54.0	68.2	330	274	208	159	207	173	130	120	MEAN
DAM3	186000	148000	145000	177000	885000	710000	558000	426000	538000	463000	336000	320000	DAM3
MAX	77.5	60.2	55.8	114	559	308	265	196	287	193	168	140	MAX
MIN	64.5	56.0	52.7	56.1	102	219	171	124	119	160	93.2	97.2	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, 195 M3/S
TOTAL DISCHARGE, 6098000 DAM3
MAXIMUM DAILY DISCHARGE, 559 M3/S ON MAY 16
MINIMUM DAILY DISCHARGE 52.7 M3/S ON MAR 12

B-ICE CONDITIONS

MAXIMUM INSTANTANEOUS DISCHARGE, 561 M3/S AT 1250 ON May 16



3.5

STATION NAME:	Dunkirk River near Fort MacKay
STATION NUMBER:	07DB003
LOCATION:	Latitude 56°51'20", Longitude 112°42'40", SE 06-91-17-W4
DRAINAGE AREA:	611 square miles (1 580 km^2)
PERIOD OF RECORD:	This station was established on August 18 1975. Continuous discharge data are available to March 1979. Station discontinued after March 31 1979.
SITE DESCRIPTION:	The gauge is located on the right bank 52 air miles (84 km) west of Fort McMurray. This station is instrumented with a Stacom manometer linked to a Stevens A-71 recorder. Open water measurements are made by wading at various locations near the gauge or from the cableway 35 feet (11 m) below the gauge.
GENERAL:	This station appears to have a stable control. The stage discharge relationship has been well defined throughout the measured range in stage.

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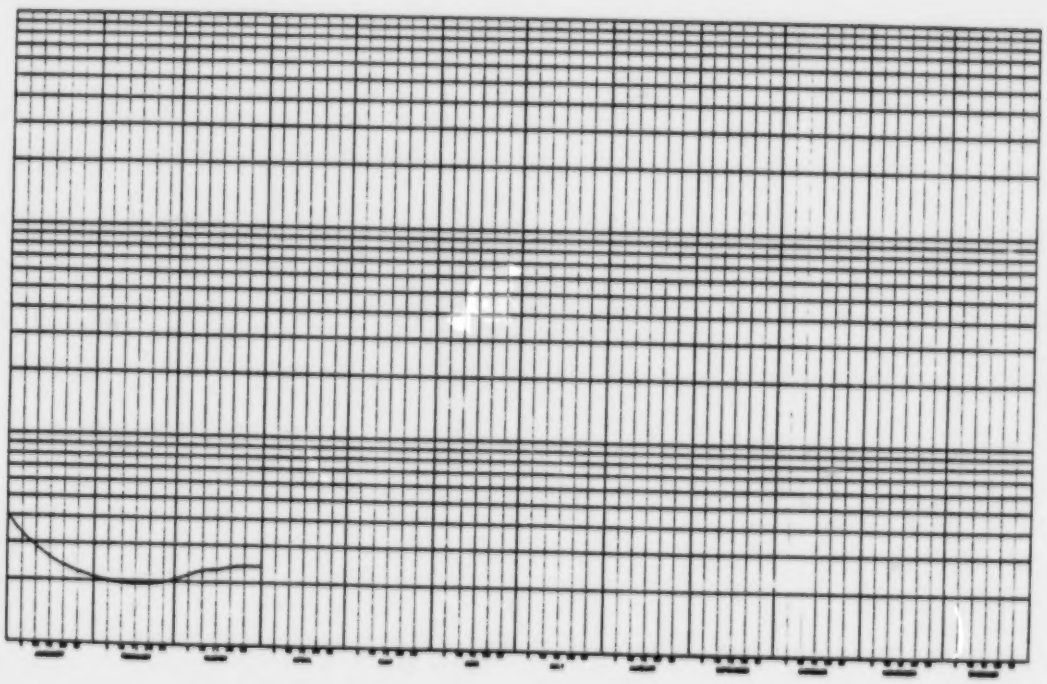
PEACE RIVER NEAR FORT MACKAY — STATION NO. 07OB001

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.182 B	.206 B	.208 B										1
2	.186 B	.204 B	.210 B										2
3	.190 B	.202 B	.212 B										3
4	.190 B	.200 B	.214 B										4
5	.330 B	.200 B	.216 B										5
6	.326 B	.198 B	.218 B										6
7	.318 B	.196 B	.220 B										7
8	.306 B	.196 B	.222 B										8
9	.298 B	.194 B	.224 B										9
10	.284 B	.192 B	.226 B										10
11	.278 B	.190 B	.229 B										11
12	.275 B	.190 B	.230 B										12
13	.268 B	.190 B	.230 B										13
14	.260 B	.190 B	.232 B										14
15	.256 B	.190 B	.232 B										15
16	.250 B	.190 B	.232 B										16
17	.248 B	.190 B	.234 B										17
18	.244 B	.190 B	.234 B										18
19	.240 B	.190 B	.236 B										19
20	.236 B	.192 B	.238 B										20
21	.232 B	.192 B	.238 B										21
22	.230 B	.194 B	.240 B										22
23	.228 B	.194 B	.240 B										23
24	.224 B	.196 B	.240 B										24
25	.222 B	.198 B	.240 B										25
26	.220 B	.198 B	.240 B										26
27	.216 B	.200 B	.240 B										27
28	.214 B	.204 B	.240 B										28
29	.212 B		.240 B										29
30	.210 B		.240 B										30
31	.208 B		.240 B										31
TOTAL	8,269	5,488	7,137										TOTAL
MEAN	.267	.195	.230										MEAN
DAM3	714	472	617										DAM3
MAX	.382	.206	.240										MAX
MIN	.208	.190	.208										MIN

SUMMARY FOR THE MONTHS JAN TO MAR
MEAN DISCHARGE, .232 M3/S
TOTAL DISCHARGE, 1800 DAM3
MAXIMUM DAILY DISCHARGE, .382 M3/S ON JAN 1
MINIMUM DAILY DISCHARGE, .190 M3/S ON FEB 11

B-ICE CONDITIONS



3.6

STATION NAME:	Ells River below Gardiner Lakes
STATION NUMBER:	07DA010
LOCATION:	Latitutde 57°22'30", Longitude 112°33'40", SE 05-97-16-W4
DRAINAGE AREA:	527 square miles (1 360 km^2)
PERIOD OF RECORD:	This station was established June 25 1975. Discharge data are available on a continuous basis to March 1979. Station discontinued after March 31 1979.
SITE DESCRIPTION:	The gauge is located on the left bank approximately five miles (8 km) below Gardiner Lakes and 37 air miles (60 km) northwest of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open water discharge measurements are made by wading 1,000 feet (300 m) above the gauge or from the cableway immediately above the gauge.
GENERAL:	The drainage system of this river consists almost entirely of a series of lakes including Namur, Gardiner, Eaglenest and several small lakes. As a result, the water is relatively clear and the stream responds quite slowly to hydrologic events.

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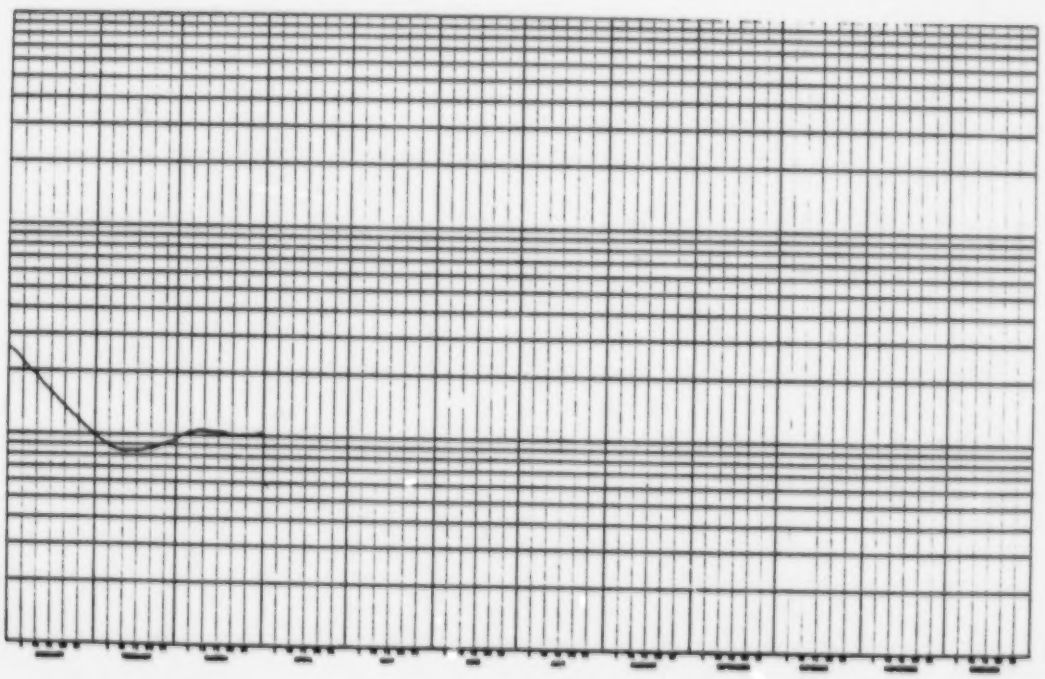
ELLS RIVER NELSON GARDINER LAKES — STATION NO. 07DA010

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN		FEB		MAR		APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	2.55	H	.963	H	.977	B										1
2	2.46	B	.949	H	.991	B										2
3	2.41	B	.934	B	1.01	B										3
4	2.32	B	.906	B	1.02	B										4
5	2.24	B	.892	B	1.03	B										5
6	2.15	B	.878	B	1.05	B										6
7	2.07	B	.864	B	1.05	B										7
8	2.01	B	.864	B	1.06	B										8
9	1.95	B	.852	B	1.08	B										9
10	1.90	B	.850	B	1.08	B										10
11	1.81	B	.850	B	1.06	B										11
12	1.74	B	.850	B	1.06	B										12
13	1.70	B	.850	B	1.06	B										13
14	1.67	B	.850	B	1.05	B										14
15	1.61	B	.850	B	1.05	B										15
16	1.56	B	.850	B	1.05	B										16
17	1.50	B	.850	B	1.03	B										17
18	1.47	B	.868	B	1.03	B										18
19	1.42	B	.864	B	1.02	B										19
20	1.39	B	.864	B	1.02	B										20
21	1.33	B	.878	B	1.01	B										21
22	1.30	B	.878	B	1.01	B										22
23	1.25	B	.892	B	1.01	B										23
24	1.22	B	.906	B	1.01	B										24
25	1.19	B	.906	B	1.01	B										25
26	1.13	B	.920	B	1.01	B										26
27	1.10	B	.934	B	1.01	B										27
28	1.08	B	.949	B	1.02	B										28
29	1.05	B			1.03	B										29
30	1.02	B			1.06	B										30
31	.991	B			1.10	B										31
TOTAL	58.591		24.757		32.098											TOTAL
MEAN	1.83		.884		1.03											MEAN
DAM3	4370		2180		2770											DAM3
MAX	2.55		.963		1.10											MAX
MIN	.991		.850		.977											MIN

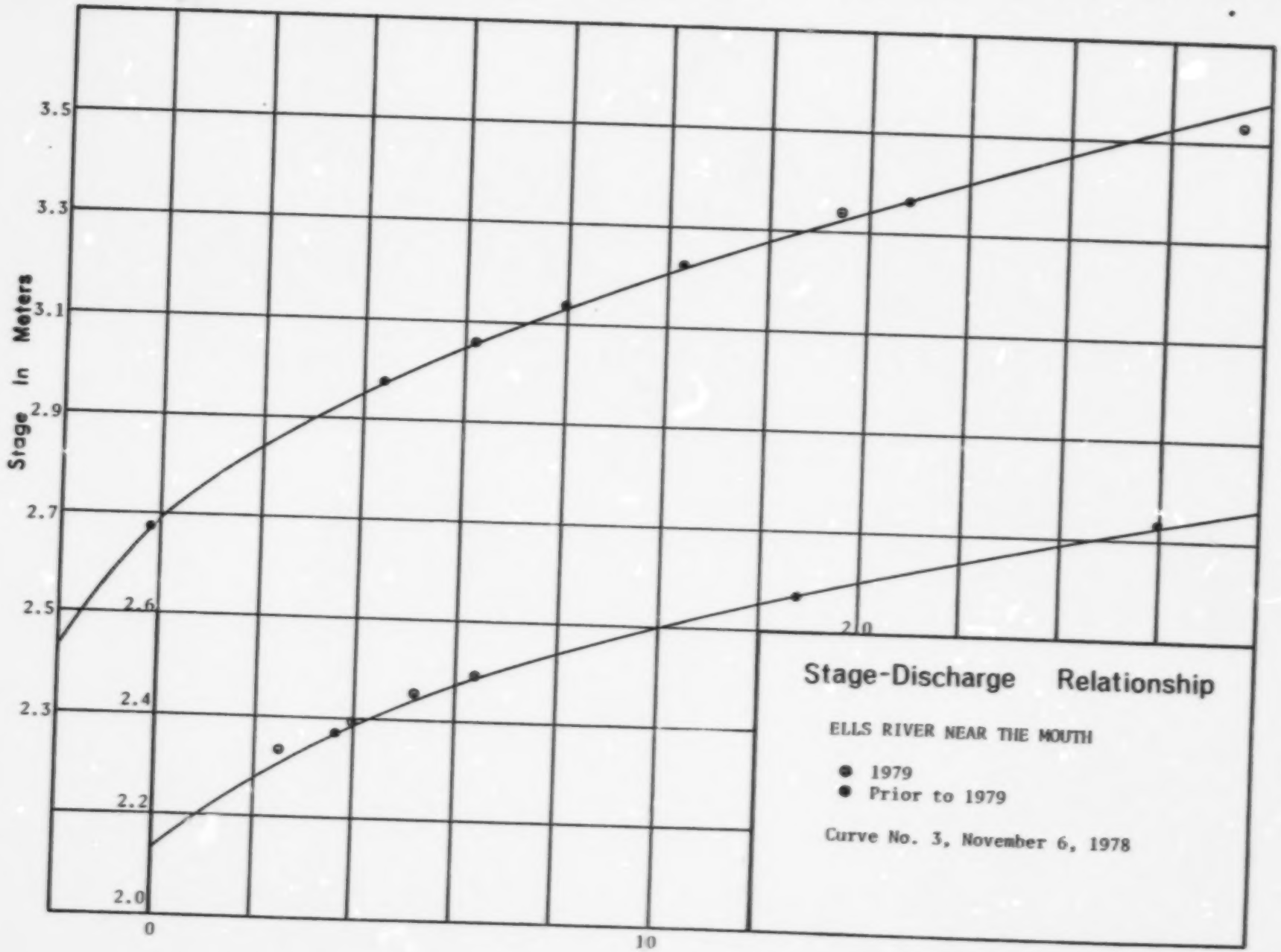
SUMMARY FOR THE MONTHS JAN TO MAR
MEAN DISCHARGE, 1.19 M3/S
TOTAL DISCHARGE, 9260 DAM3
MAXIMUM DAILY DISCHARGE, 2.55 M3/S ON JAN 1
MINIMUM DAILY DISCHARGE, .850 M3/S ON FEB 10

B=ICE CONDITIONS



3.7

STATION NAME:	Ells River near the Mouth
STATION NUMBER:	07DA017
LOCATION:	Latitude 57°16'04", Longitude 111°42'51", SW 27-95-11-W4
DRAINAGE AREA:	960 square miles (2 490 km^2)
PERIOD OF RECORD:	The station was established July 28 1975. Discharge data are available on a continuous basis to December 1979.
SITE DESCRIPTION:	The gauge is located on the right bank approximately five miles (8 km) above the confluence with the Athabasca River and approximately seven air miles (11 km) northwest of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open water discharge measurements are made by wading near the gauge or from the cableway located approximately 500 feet (150 m) below the gauge.
GENERAL:	The stage discharge relationship is reasonably well defined and appears quite stable.


Stage In Meters
3.5
3.3
3.1
2.9
2.7
2.5
2.3
2.6
2.4
2.2
2.0
0
10
20
Stage-Discharge Relationship
ELLS RIVER NEAR THE MOUTH
1979
Prior to 1979
Curve No. 3, November 6, 1978

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ELLS RIVER NEAR THE MOUTH

STATION NO. 07DA017

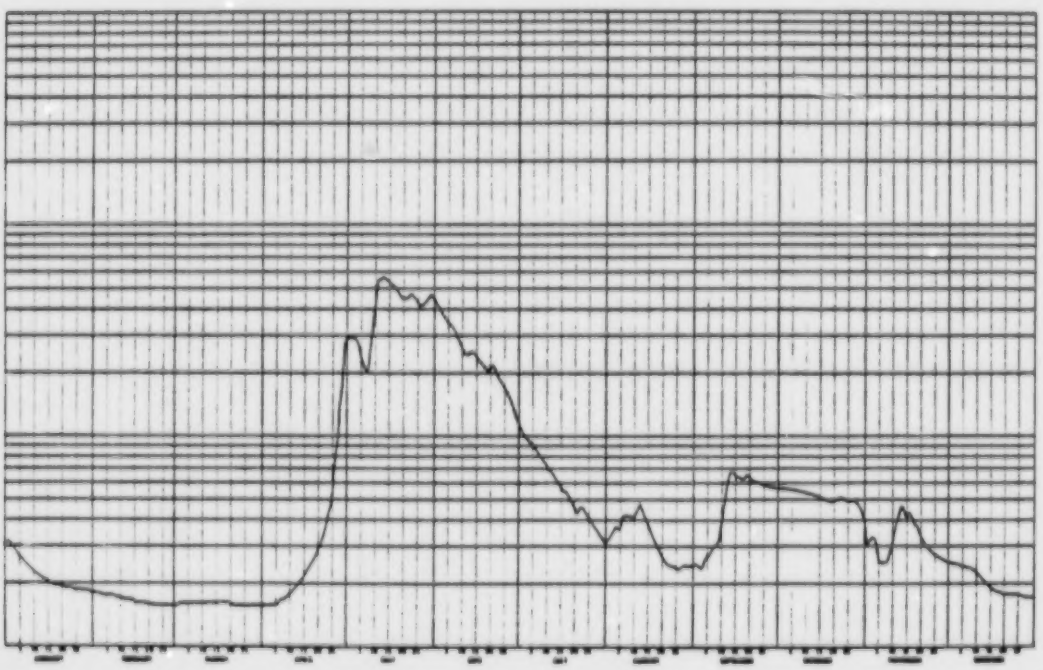
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	1.20 A	1.05 A	1.00 B	1.00 B	29.3 A	42.7	10.8	3.19	2.54	5.05 E	3.00 B	2.55 B	1
2	1.10 A	1.05 A	1.05 B	1.00 B	29.4 A	40.9	10.3	3.00	2.66	5.05 E	3.20 B	2.50 B	2
3	2.95 A	1.00 B	1.05 B	1.00 A	29.2 B	38.2	9.79	3.07	2.37	5.05 E	3.36 B	2.50 B	3
4	2.80 B	1.00 B	1.05 B	1.00 B	29.3 B	36.3	9.59	3.74	2.66	5.00 E	3.27 B	2.50 B	4
5	2.70 B	1.00 B	1.05 B	1.01 B	25.9 B	34.7	9.23	3.66	2.72	5.00 E	3.00 B	2.45 B	5
6	2.65 B	1.00 B	1.04 B	1.05 A	21.5 B	33.9	8.90	4.25	2.77	5.00 E	2.95 B	2.45 B	6
7	2.55 B	1.00 B	1.05 B	1.70 A	20.4 B	32.9	8.45	4.22	3.00	5.00 E	2.90 B	2.40 B	7
8	2.45 A	1.77 B	1.05 B	1.70 B	21.1 B	30.1	8.01	4.22	3.06	5.55 E	2.90 B	2.40 B	8
9	2.00 B	1.75 B	1.05 B	1.75 B	20.0 B	28.0	7.62	4.25	3.22	5.55 E	2.80 B	2.35 B	9
10	2.50 B	1.75 B	1.05 B	1.80 B	40.5	26.2	7.42	4.08	3.93	5.50 E	3.15 B	2.30 B	10
11	2.25 B	1.70 A	1.05 B	1.85 B	50.0	24.7	6.95	4.47	4.73	5.45 E	3.50 B	2.20 B	11
12	2.10 B	1.70 B	1.05 B	1.90 B	50.8	24.2	6.81	4.90	6.06	5.40 E	4.22 B	2.15 B	12
13	2.15 B	1.70 B	1.05 B	2.00 B	54.8	23.3	6.38	4.56	6.83	5.35 E	4.09 B	2.05 B	13
14	2.10 B	1.70 B	1.05 B	2.05 B	55.4	23.6	6.86	4.19	6.79	5.30 E	4.50 B	2.00 B	14
15	2.05 B	1.65 B	1.05 B	2.15 B	50.9	20.6	5.92	3.84	6.53	5.20 E	4.11 B	1.95 B	15
16	2.05 A	1.65 A	1.05 B	2.30 B	52.8	23.2	5.56	3.63	6.05	5.05 E	4.40 B	1.90 B	16
17	2.00 B	1.65 A	1.05 B	2.05 B	50.8	22.2	5.52	3.36	6.27	5.00 A	4.15 B	1.85 B	17
18	2.00 B	1.65 A	1.05 B	2.55 B	48.6	21.6	5.20	3.09	6.37	4.90	3.87 B	1.85 B	18
19	2.00 B	1.65 A	1.05 B	2.70 B	45.0	20.6	4.86	2.95	6.66	4.81	3.80 B	1.85 B	19
20	1.95 B	1.65 B	1.05 B	2.90 B	44.0	21.5	4.58	2.73	6.37	4.80	3.35 B	1.80 B	20
21	1.95 B	1.60 A	1.00 B	3.10 B	46.8	22.1	4.32	2.60	6.18	5.05	3.20 B	1.80 B	21
22	1.95 B	1.60 A	1.00 B	3.40 B	45.9	20.7	4.63	2.68	6.15	5.15	3.05 B	1.80 B	22
23	1.95 B	1.60 B	1.00 B	3.90 B	47.5	19.2	4.59	2.68	6.87	5.09	2.95 B	1.80 B	23
24	1.90 B	1.60 B	1.00 B	4.60 B	45.3	18.5	4.33	2.63	5.91	5.01	2.85 B	1.80 B	24
25	1.90 B	1.60 B	1.00 B	5.32 B	43.1	17.9	4.19	2.61	5.89 E	4.86	2.80 B	1.80 B	25
26	1.90 B	1.60 A	1.00 B	7.40 B	40.8	16.6	3.96	2.34	5.85 E	4.96 B	2.75 B	1.80 B	26
27	1.90 B	1.60 B	1.00 B	9.83 B	41.2	15.5	3.78	2.61	5.80 E	5.00 B	2.70 B	1.75 B	27
28	1.90 B	1.60 B	1.00 A	15.0 B	43.1	14.1	3.61	2.69	5.75 E	4.86 B	2.65 B	1.75 B	28
29	1.90 B		1.00 A	20.0 B	45.1	12.7	3.42	2.66	5.70 E	4.84 B	2.60 B	1.75 B	29
30	1.85 B		1.00 B	29.4 B	46.8	11.8	3.25	2.65	5.70 E	4.66 B	2.55 B	1.75 B	30
31	1.85 B		1.00 B		48.9		3.11	2.69		4.14 B		1.75 B	31
TOTAL	68.70	47.07	50.54	101.03	1278.9	744.9	191.12	103.48	150.77	148.53	97.81	63.55	TOTAL
MEAN	2.22	1.70	1.63	3.70	41.3	24.8	6.17	3.34	5.03	5.10	3.20	2.05	MEAN
DAM3	5940	4180	4370	12200	110000	64400	16500	8940	13000	13400	8850	5490	DAM3
MAX	3.20	1.85	1.05	29.4	54.8	40.7	10.8	6.90	6.83	5.45	4.69	2.55	MAX
MIN	1.85	1.60	1.00	1.00	20.4	11.8	3.11	2.34	2.37	4.14	2.50	1.75	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, 8.69 M3/S
TOTAL DISCHARGE, 2b7080 DAM3
MAXIMUM DAILY DISCHARGE, 54.8 M3/S ON MAY 13
MINIMUM DAILY DISCHARGE, 1.00 M3/S ON FEB 21

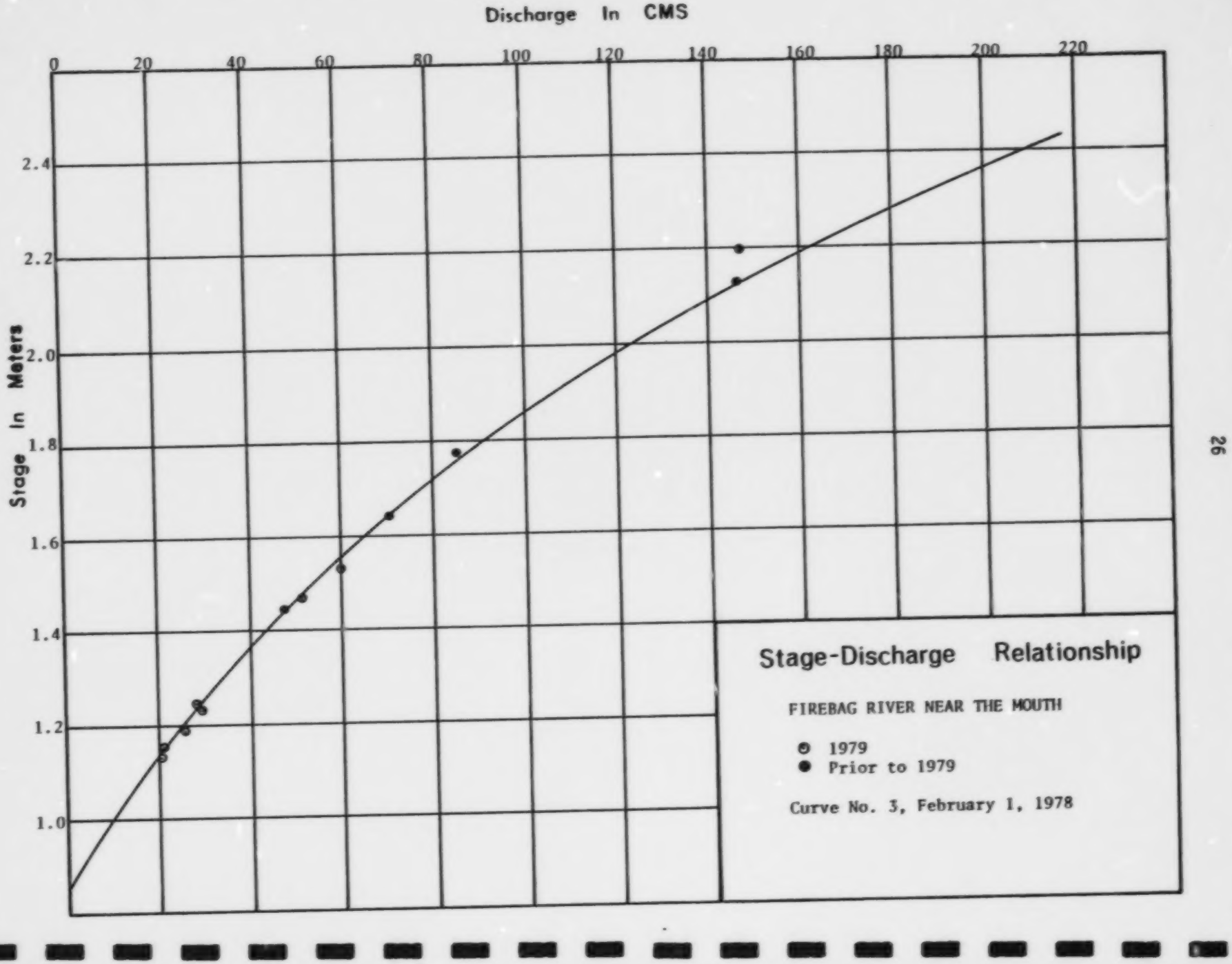
MAXIMUM INSTANTANEOUS DISCHARGE, 61.1 M3/S AT 0545 ON May 13

A=MANUAL GAUGE
B=ICE CONDITIONS
E=ESTIMATED



3.8

STATION NAME:	Firebag River near the Mouth
STATION NUMBER:	07DC001
LOCATION:	Latitude 57°38'30", Longitude 111°10'30", NE 35-99-08-W4
DRAINAGE AREA:	2 330 square miles (6 030 km^2)
PERIOD OF RECORD:	The station was established on October 16 1971. Discharge data are available on a more-or-less continuous basis to December 1979.
SITE DESCRIPTION:	The gauge is located on the right bank about eighteen and one-half miles (30 km) by river above the confluence with the Athabasca River and about 900 feet (270 m) above the Forestry bridge. The station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made from the cableway approximately three-quarters of a mile (1.2 km) below the gauge.
GENERAL:	Prior to construction of the cableway in 1976 the discharge measurements were generally made by boat at approximately the same location.


Discharge In CMS
0
20
40
60
80
100
120
140
160
180
200
220
Stage In Meters
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
Stage-Discharge Relationship
FIREBAG RIVER NEAR THE MOUTH
1979
Prior to 1979
Curve No. 3, February 1, 1978

WATER SURVEY OF CANADA
MAY 16 1980 PAGE 39
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PINERAS RIVER NEAR THE MOUTH — STATION NO. 07DC001

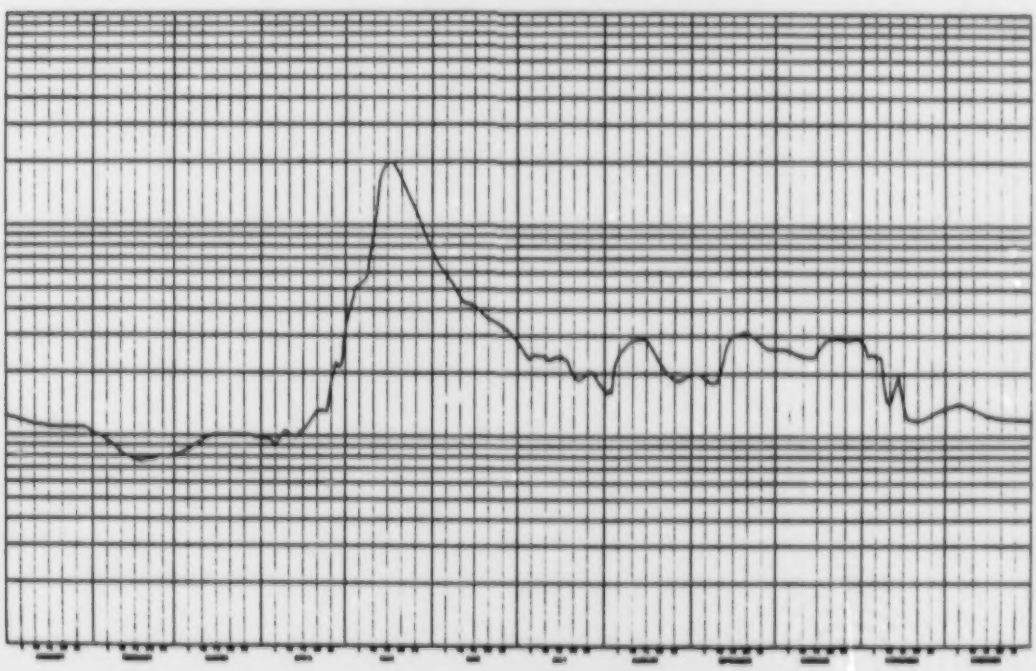
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	12.0 B	10.2 B	8.20 B	10.0 B	36.1 B	72.7	26.4	16.2	20.0	26.1	27.7 B	15.8 B	1
2	12.2 B	10.2 B	8.20 B	9.80 B	48.0 B	68.2	25.4	16.9	20.1	24.8	24.0 B	14.8 B	2
3	12.2 B	10.4 B	8.40 B	9.88 B	43.7 B	64.3	24.7	19.2	19.9	24.2	24.7 B	14.0 B	3
4	12.0 B	9.88 B	8.60 B	9.70 B	50.2	61.8	23.8	21.9	19.8	25.7	24.9 B	13.2 B	4
5	12.0 B	9.60 B	8.80 B	9.87 B	58.8	59.5	23.5	23.8	19.1	25.8	26.1 B	14.4 B	5
6	11.8 B	9.37 B	8.80 B	9.27 B	52.3	57.2	24.5	25.0	18.5	25.5	24.0 B	14.6 B	6
7	11.8 B	9.20 B	8.96 B	9.01 B	53.8	56.7	24.5	26.8	18.2	25.8	24.3 B	14.2 B	7
8	11.6 B	9.00 B	9.20 B	10.3 B	55.7	52.1	24.6	27.8	17.9	24.6	17.0 B	14.8 B	8
9	11.6 B	8.80 B	9.40 B	10.8 B	68.0 B	49.2	24.5	27.9	18.1	24.6	14.7 B	13.8 B	9
10	11.6 B	8.60 B	9.60 B	10.6 B	77.1 B	46.7	24.1	28.1	19.3	24.3	14.8 B	13.6 B	10
11	11.6 B	8.20 B	9.80 B	10.2 B	96.2 B	44.3	23.3	28.9	21.9	23.9	15.6 B	13.6 B	11
12	11.2 B	8.00 B	10.0 B	10.1 B	120 B	43.6	23.1	29.3	20.5	24.8	17.0 B	13.2 B	12
13	11.2 B	8.00 B	10.0 B	9.98 B	173 B	43.1	23.7	29.3	27.0	23.8	19.7 B	13.6 B	13
14	11.2 B	7.80 B	10.2 B	10.5	185 B	43.1	23.8	29.4	29.5	23.6	19.7 B	12.8 B	14
15	11.1 B	7.60 B	10.2 B	10.7 B	196	42.9	24.2	29.9	30.1	25.8	14.5 B	12.6 B	15
16	11.0 B	7.80 B	10.2 B	10.9 B	201	41.3	24.2	28.2	30.8	26.2	12.3 B	12.6 B	16
17	11.0 B	7.60 B	10.2 B	11.3 B	200	38.4	23.1	27.1	30.8	27.8	12.1 B	12.6 B	17
18	11.0 B	7.60 B	10.2 B	12.0 B	193	36.2	22.3	25.9	31.1	28.6	12.8 B	12.6 B	18
19	11.0 B	7.80 B	10.2 B	12.7 B	185	33.8	21.5	23.7	31.6	28.6	13.0 B	13.6 B	19
20	11.0 B	7.80 B	10.2 B	13.1 B	172	34.6	20.6	22.5	31.4	29.2	12.8 B	12.6 B	20
21	11.0 B	7.60 B	10.2 B	13.4 B	158	36.1	18.9	21.5	30.8	29.5	12.8 B	12.2 B	21
22	11.0 B	7.80 B	10.2 B	13.3 B	149	35.5	18.7	20.2	30.2	29.5	12.2 B	12.2 B	22
23	11.0 B	8.00 B	10.2 B	13.3 B	139	36.7	18.8	19.7	29.3	29.3	12.4 B	12.2 B	23
24	11.0 B	8.00 B	10.2 B	13.0 B	129	36.4	19.0	19.0	28.6	29.2	12.6 B	12.2 B	24
25	11.0 B	8.00 B	10.2 B	12.8 B	122	33.5	20.2	18.5	27.4	28.6	12.8 B	12.2 B	25
26	11.0 B	8.00 B	10.2 B	20.2 B	114	32.7	20.3	18.3	26.8	28.9	13.0 B	12.2 B	26
27	11.0 B	8.00 B	10.2 B	22.6 B	105	32.1	20.6	18.3	26.2	28.8	13.2 B	12.2 B	27
28	11.0 B	8.00 B	10.2 B	21.4 B	97.9	31.8	19.6	18.6	26.1	28.1	13.4 B	12.2 B	28
29	10.8 B		10.0 B	21.5 B	90.3	29.5	18.6	19.6	26.8	29.3	13.8 B	12.2 B	29
30	10.6 B		10.0 B	24.9 B	83.6	28.8	17.6	19.6	26.1	29.3	13.8 B	12.2 B	30
31	10.4 B		10.0 B		77.7		16.5	19.8		27.8 B		12.8 B	31
TOTAL	349.9	234.37	300.78	393.79	3518.4	1322.3	684.8	718.8	757.1	834.8	493.9	401.8	TOTAL
MEAN	11.3	8.44	9.70	13.1	113	44.1	22.1	23.2	25.2	26.9	16.5	13.0	MEAN
DAM3	38280	20800	26000	34800	304000	114000	59196	62000	65400	72100	42700	34700	DAM3
MAX	12.0	10.2	10.2	24.9	201	72.7	26.4	29.4	31.6	29.5	27.7	15.8	MAX
MIN	10.4	7.60	8.20	9.87	36.1	28.8	16.5	16.2	17.9	23.8	12.8	12.0	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE,27.0 M3/S
TOTAL DISCHARGE, 8459000 DAM3
MAXIMUM DAILY DISCHARGE, 201 M3/S ON MAY 16
MINIMUM DAILY DISCHARGE, 7.60 M3/S ON FEB 17

B=ICE CONDITIONS

MAXIMUM INSTANTANEOUS DISCHARGE, 304 M3/S AT 1215 ON May 16



3.9

STATION NAME:	Gregoire Lake near Fort McMurray
STATION NUMBER:	07CE001
LOCATION:	Latitude 56°27'00", Longitude 111°03'30"
DRAINAGE AREA:	
PERIOD OF RECORD:	This station was established August 1, 1969. Water levels are available for open-water seasons to 1979.
SITE DESCRIPTION:	The gauge is located 30 m west of the outlet to Gregoire River. This station is now instrumented with a Stacom manometer linked to a Stevens A-35 water level recorder.
GENERAL:	Water levels are referred to Geodetic datum.

WATER SURVEY OF CANADA
MAY 10 1980 PAGE 4
CALGARY, ALTA

GREGOIRE LAKE NEAR FT. MCMURRAY — STATION NO. 07CE001

(PRELIMINARY) DAILY WATER LEVEL IN METRES FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1					475.262 B	475.525	475.389	475.306	475.297	475.683	475.527		1
2					475.267 B	475.516	475.384	475.355	475.293	475.668	475.546		2
3					475.271 B	475.506	475.384	475.359	475.299	475.673	475.565		3
4					475.276 B	475.500	475.377	475.395	475.304	475.658	475.547		4
5					475.281 B	475.506	475.368	475.369	475.390	475.672	475.339		5
6					475.285 B	475.525	475.366	475.361	475.299	475.387	475.323 B		6
7					475.290 B	475.509	475.372	475.358	475.388	475.369	475.321 B		7
8					475.296 B	475.510	475.383	475.395	475.383	475.356	475.322 B		8
9					475.300 B	475.502	475.376	475.351	475.366	475.352	475.326 B		9
10					475.306 B	475.495	475.368	475.368	475.382	475.353	475.326 B		10
11					475.311 B	475.484	475.391	475.361	475.382	475.351	475.325 B		11
12					475.326 B	475.498	475.378	475.386	475.403	475.354	475.325 B		12
13					475.383 B	475.488	475.404	475.367	475.428	475.369	475.325 B		13
14					475.367 B	475.502	475.415	475.383	475.434	475.369	475.325 B		14
15					475.394 B	475.494	475.415	475.364	475.458	475.335	475.326 B		15
16					475.417 B	475.487	475.420	475.368	475.476	475.352	475.321 B		16
17					475.442 B	475.492	475.425	475.382	475.461	475.351			17
18					475.466 B	475.479	475.421	475.362	475.469	475.357			18
19					475.487 B	475.488	475.422	475.339	475.465	475.351			19
20					475.501 B	475.487	475.422	475.345	475.462	475.345			20
21					475.512 B	475.476	475.403	475.327	475.456	475.341			21
22					475.523 B	475.469	475.429	475.318	475.457	475.339			22
23					475.530 B	475.467	475.418	475.327	475.461	475.338			23
24					475.536 B	475.466	475.403	475.310	475.485	475.339			24
25					475.541	475.503	475.396	475.305	475.530	475.339			25
26					475.539	475.519	475.392	475.303	475.502	475.345			26
27					475.552	475.506	475.388	475.312	475.517	475.347			27
28					475.556	475.462	475.376	475.316	475.505	475.346			28
29					475.549	475.416	475.369	475.307	475.491	475.347			29
30					475.539	475.398	475.368	475.306	475.488	475.342			30
31					475.525		475.359	475.313		475.331			31
TOTAL					14737.777	14264.000	14737.169	14735.465	14262.000	14736.288			TOTAL
MEAN					475.412	475.489	475.392	475.338	475.416	475.364			MEAN
MAX					475.556	475.525	475.429	475.368	475.536	475.683			MAX
MIN					475.262	475.398	475.359	475.303	475.293	475.339			MIN

SUMMARY FOR THE YEAR 1979

MAXIMUM DAILY WATER LEVEL, 475.556 METRES ON MAY 28

MINIMUM DAILY WATER LEVEL, 475.262 METRES ON MAY 1
MAXIMUM INSTANTANEOUS WATER LEVEL: METRES AT ON
WATER LEVELS ARE REFERRED TO GSC

B=ICE CONDITIONS

3.10

STATION NAME: Hangingstone River at Fort McMurray

STATION NUMBER: 07CD004

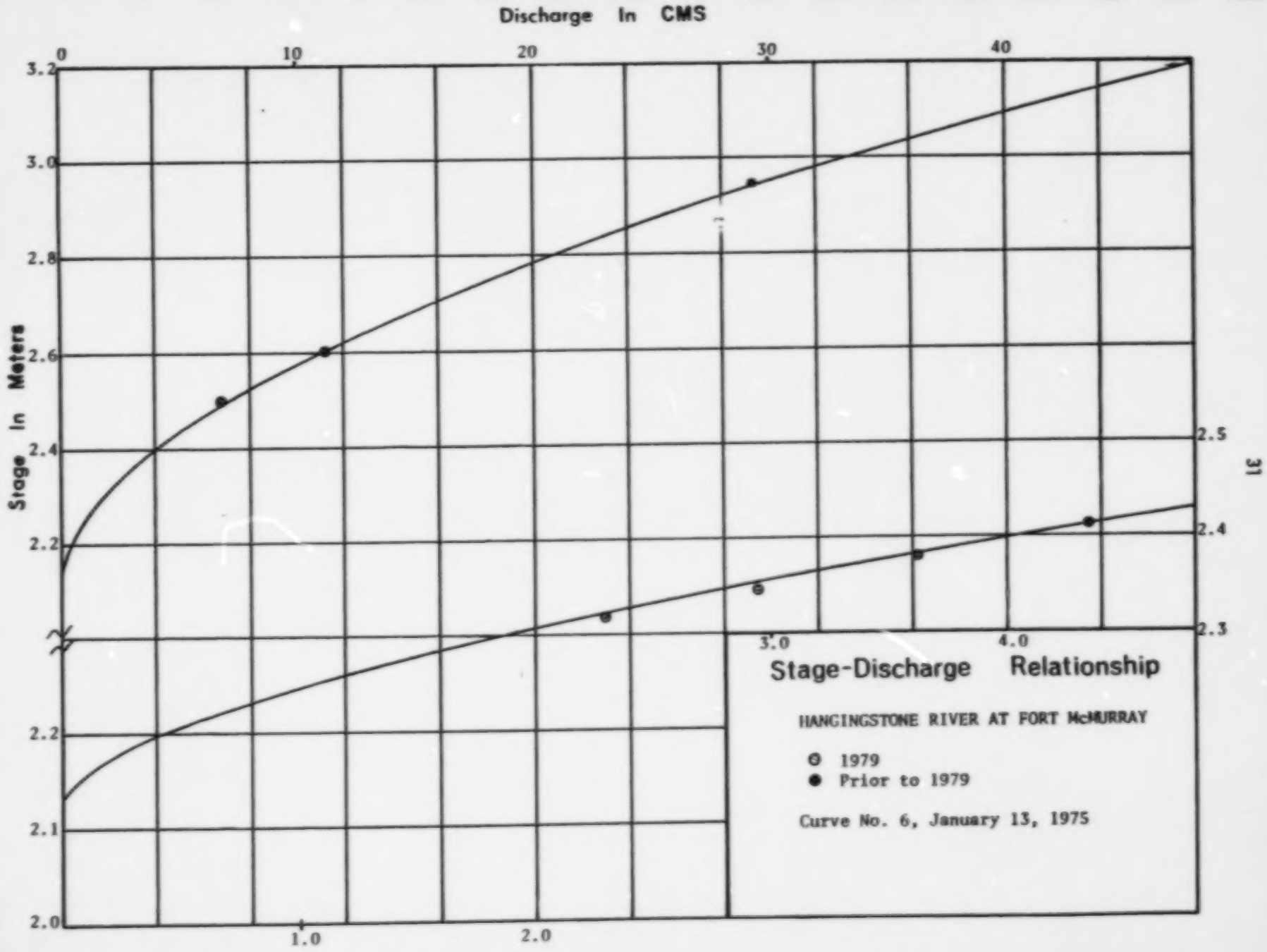
LOCATION: Latitude 56°42'18", Longitude 111°21'20", NW 10-89-09-W4.

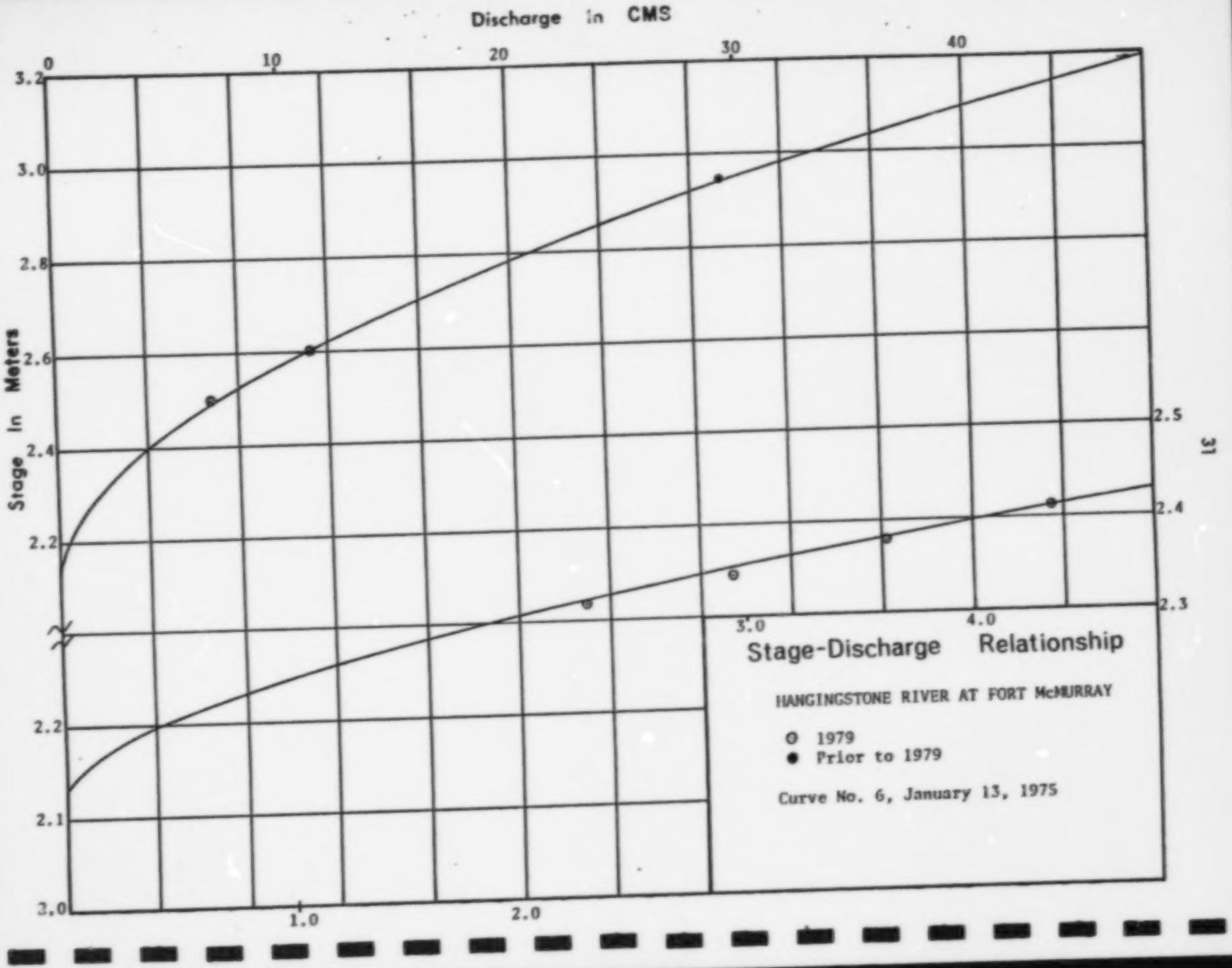
DRAINAGE AREA: 353 square miles (914 km^2)

PERIOD OF RECORD: The station was established on April 8 1965. Discharge data for periods of varying length are available to 1969. From January 1970 to December 1979 discharge data were collected on a continuous basis.

SITE DESCRIPTION: The gauge is a wire-weight gauge located on the traffic bridge between Fort McMurray and Waterways. The gauge is read on a daily basis during the open-water period by a paid observer. Open-water measurements are made by wading at various locations or from the highway bridge about one-quarter mile (0.4 km) upstream from the gauge.

GENERAL:


Discharge In CMS
0
10
20
30
40
3.2
3.0
2.8
2.6
2.4
2.2
2.2
2.1
2.0
1.0
2.0
3.0
4.0
2.5
2.4
2.3
Stage In Meters
Stage-Discharge Relationship
HANGINGSTONE RIVER AT FORT McMURRAY
1979
Prior to 1979
Curve No. 6, January 13, 1975


Discharge In CMS
0
10
20
30
40
Stage In Meters
3.2
3.0
2.8
2.6
2.4
2.2
2.2
2.1
2.0
1.0
2.0
3.0
4.0
2.5
2.4
2.3
Stage-Discharge Relationship
HANGINGSTONE RIVER AT FORT McMURRAY
1979
Prior to 1979
Curve No. 6, January 13, 1975

WATER SURVEY OF CANADA
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MARGINSBURG RIVER AT PORT MC MURRAY

STATION NO. 07CD004

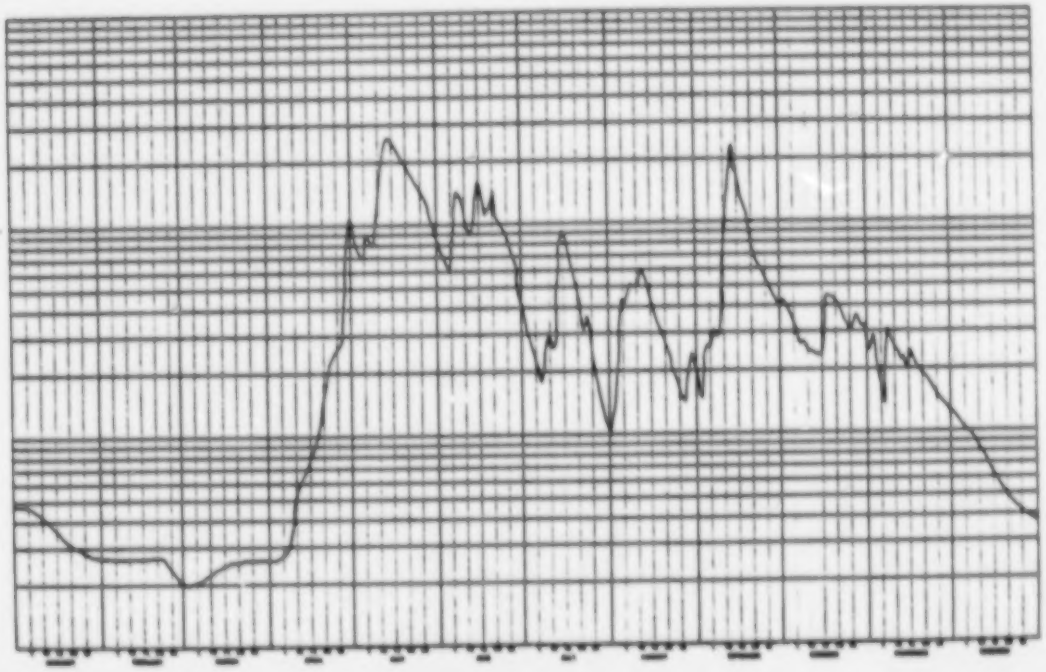
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.285 B	.270 B	.280 B	.260 B	9,80 B	8,19	3,50	1,81	1,80	4,36	2,94	1,09 B	1
2	.288 B	.270 B	.280 B	.260 B	8,60 B	7,19	3,28	1,84	1,66	4,03	2,91	1,10 B	2
3	.288 B	.270 B	.280 B	.260 B	8,07 B	6,66	2,94	2,03	2,06	3,73	2,13	1,13 B	3
4	.273 B	.270 B	.295 B	.255 B	8,86 B	6,15	2,82	2,36	2,59	3,58	1,85	1,08 B	4
5	.270 B	.270 B	.290 B	.270 B	8,19 B	9,05	2,33	4,11	2,52	3,21	1,69 B	1,04 B	5
6	.285 B	.270 B	.310 B	.280 B	9,28 B	9,82	2,07	4,11	3,10	3,10	1,35	1,01 B	6
7	.283 B	.270 B	.315 B	.280 B	9,31 B	10,6	1,74	4,78	2,86	2,65	3,16 B	.970 B	7
8	.258 B	.270 B	.310 B	.270 B	7,99 B	10,8	2,33	5,88	2,01	2,78	2,90 B	.928 B	8
9	.258 B	.270 B	.295 B	.280 B	10,0 B	13,5	2,86	5,88	4,36	2,52	2,78 B	.870 B	9
10	.235 B	.270 B	.280 B	.260 B	13,2 B	11,2	3,88	6,87	11,3	2,46	2,58 B	.830 B	10
11	.215 B	.270 B	.235 B	.260 B	18,6 B	9,36	2,52	6,88	15,1	2,46	2,33 B	.780 B	11
12	.208 B	.270 B	.200 B	.260 B	23,1	8,78	2,72	5,95	21,2	2,39	2,20 B	.736 B	12
13	.190 B	.260 B	.200 B	.260 B	25,6	11,2	7,96	5,58	21,0	2,33	2,03 B	.688 B	13
14	.175 B	.270 B	.205 B	.700 B	26,6	15,6	8,55	5,13	18,6	2,30	1,96 B	.650 B	14
15	.365 B	.270 B	.260 B	.790 B	25,6 E	16,1	9,98	4,36	15,7	3,36	2,46 B	.610 B	15
16	.355 B	.270 B	.250 B	.850 B	23,6	14,0	8,55	3,81	13,0	3,04	2,28 B	.580 B	16
17	.345 B	.270 B	.255 B	.900 B	23,6	11,2	6,66	3,07	12,6	4,53	2,16 B	.560 B	17
18	.335 B	.275 B	.255 B	1,01 B	22,2	11,6	5,09	3,21	10,8	4,36	2,00 B	.530 B	18
19	.325 B	.270 B	.255 B	1,36 B	20,2	11,9	4,53	2,93	9,56	4,36	1,96 B	.510 B	19
20	.315 B	.270 B	.255 B	1,68 B	19,1	14,9	3,66	2,79	8,19	4,04	1,82 B	.490 B	20
21	.305 B	.270 B	.260 B	1,90 B	18,8	18,8	3,36	2,59	7,98	3,81	1,75 B	.480 B	21
22	.300 B	.270 B	.260 B	2,19 B	17,6	19,3	3,07	2,13	6,66	3,56	1,66 B	.460 B	22
23	.295 B	.260 B	.260 B	2,35 B	16,7	9,98	3,73	1,98	6,15	3,36	1,60 B	.450 B	23
24	.290 B	.265 B	.260 B	2,53 B	15,6	9,51	3,28	1,69	5,69	3,19	1,53 B	.430 B	24
25	.285 B	.255 B	.260 B	2,69 B	15,6	8,78	2,65	1,98	5,32	3,07	1,48 B	.420 B	25
26	.280 B	.225 B	.260 B	2,68 B	18,9	7,85	1,80	1,66	4,87	3,43	1,41 B	.410 B	26
27	.275 B	.215 B	.260 B	3,66 B	13,2	7,08	1,69	1,39	4,53	3,66	1,37 B	.400 B	27
28	.270 B	.205 B	.260 B	4,80 B	11,3	5,13	1,66	2,07	4,28	3,43	1,32 B	.390 B	28
29	.270 B		.260 B	9,59 B	9,66	4,62	1,35	2,66	4,11	3,21	1,28 B	.380 B	29
30	.270 B		.260 B	10,7 B	8,78	3,89	1,12	3,26	4,88	3,21	1,24 B	.370 B	30
31	.270 B		.260 B		8,55		,957	3,20		3,99		.360 B	31
TOTAL	11,379	7,366	7,688	93,869	467,95	299,24	111,417	102,38	234,76	103,00	59,69	23,880	TOTAL
MEAN	.367	.262	.299	1,84	15,1	9,97	3,59	3,30	7,83	3,33	1,98	.674	MEAN
DAM3	983	635	664	4830	40400	25900	9630	8850	20300	8910	5140	1880	DAM3
MAX	.285	.275	.260	10,7	26,6	16,1	9,98	6,95	21,2	4,53	3,16	1,28	MAX
MIN	.270	.205	.250	.260	8,86	3,89	,957	1,81	1,66	2,33	1,24	.360	MIN

SUMMARY FOR THE MONTHS JAN TO DEC

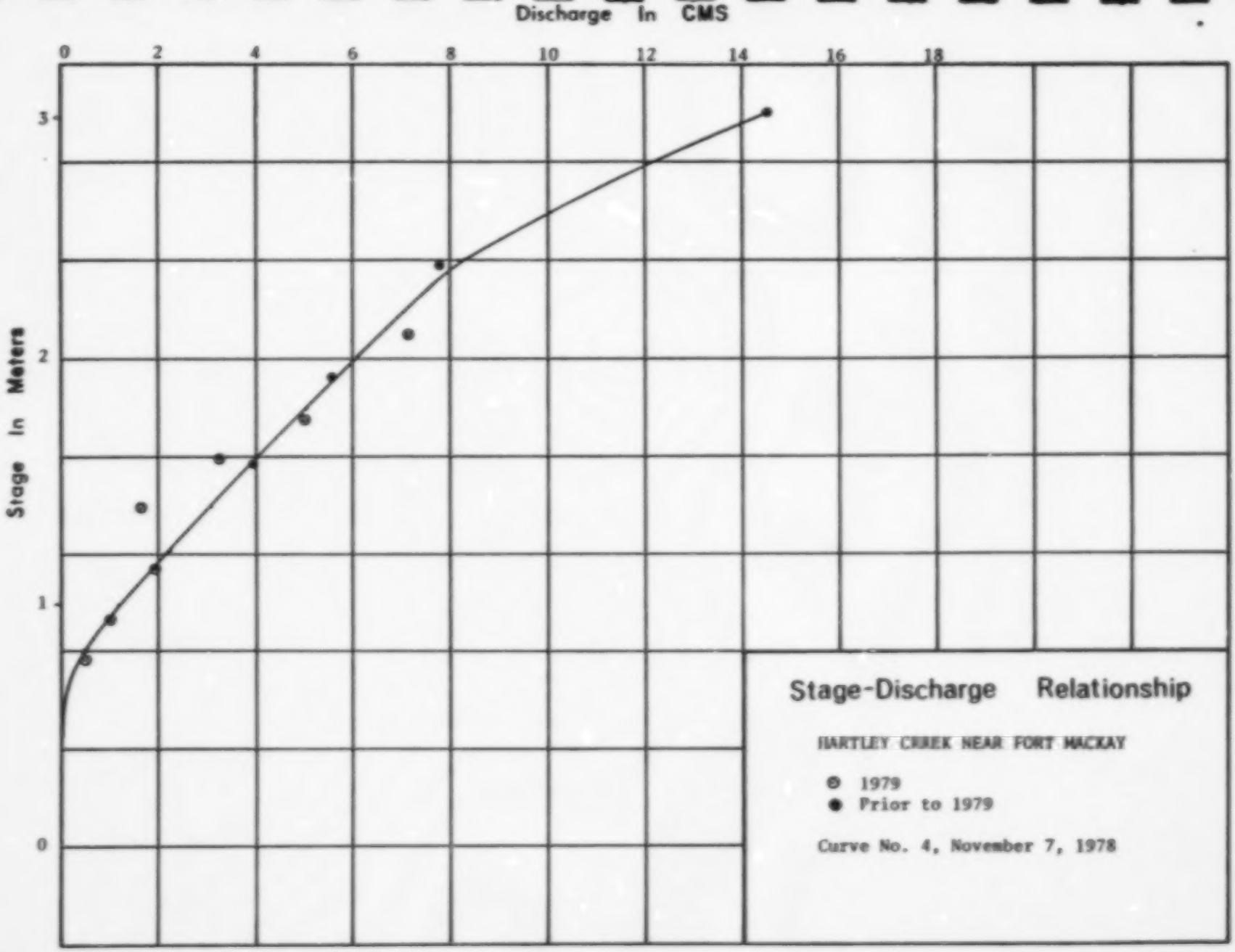
MEAN DISCHARGE, 4,84 M3/S
TOTAL DISCHARGE, 128000 DAM3
MAXIMUM DAILY DISCHARGE,26,6 M3/S ON MAY 15
MINIMUM DAILY DISCHARGE, ,250 M3/S ON MAR 1

B=ICE CONDITIONS
E=ESTIMATED



3.11

STATION NAME:	Hartley Creek near Fort MacKay
STATION NUMBER:	07DA009
LOCATION:	Latitude 57°15'34", Longitude 111°27'53", NW 19-95-09-W4
DRAINAGE AREA:	142 square miles (368 km^2)
PERIOD OF RECORD:	The station was established on June 17 1975. Discharge data are available on a continuous basis to December 1979.
SITE DESCRIPTION:	The gauge is located on the left bank approximately one-quarter mile (0.4 km) above its confluence with the Muskeg River and nine air miles (14 km) northeast of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open water measurements are made from the cableway immediately below the gauge or by wading at various locations near the gauge.
GENERAL:	The stage discharge relationship is adversely affected by beaver activity.


Discharge In CMS
0
2
4
6
8
10
12
14
16
18
Stage In Meters
3
2
1
0
Stage-Discharge Relationship
HARTLEY CREEK NEAR FORT MACKAY
1979
Prior to 1979
Curve No. 4, November 7, 1978

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HORTLEY CREEK NEAR FT. MACKAY — STATION NO. 07DD009

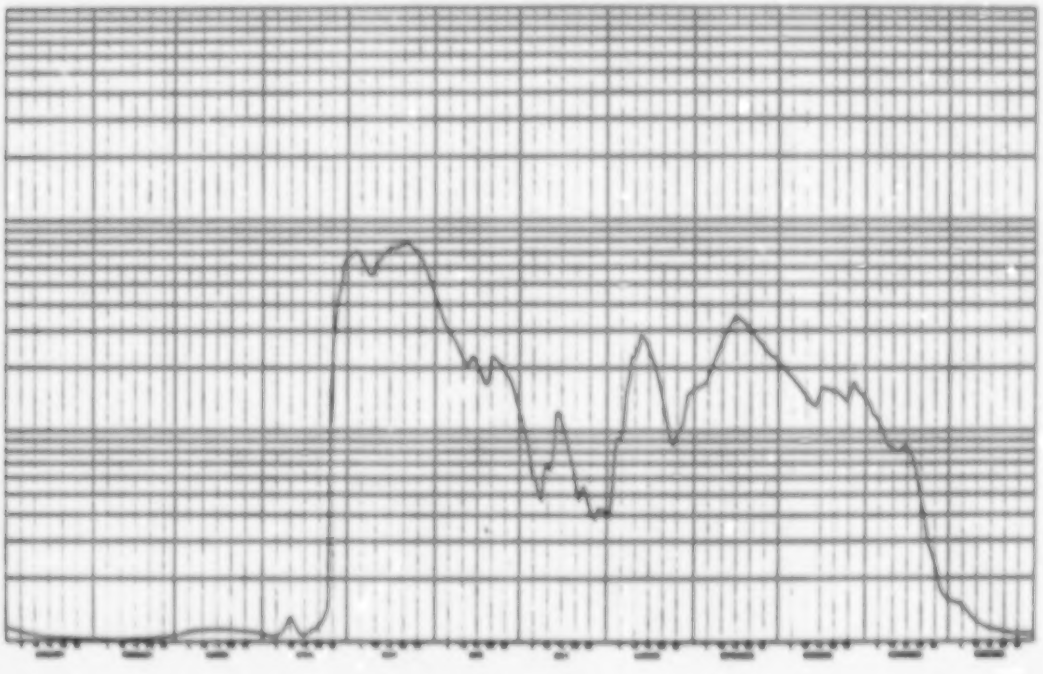
(PHOTOGRAPH) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.032 B	.006 B	.019 B	.016 B	6.90 A	4.00	1.11	.388	1.90 E	2.11	1.40 B	.116 B	1
2	.029 B	.006 B	.020 B	.017 B	7.05 B	3.68	.971	.475	1.83 E	2.06	1.36 B	.110 B	2
3	.026 B	.006 B	.022 B	.016 B	7.22 B	3.38	.850	.851	1.96 E	1.99	1.28 B	.100 B	3
4	.023 B	.006 B	.024 B	.015 B	7.10 B	3.15	.700	.958	1.99 E	1.91	1.19 B	.102 B	4
5	.021 B	.006 B	.024 B	.015 B	6.88 B	3.00	.610	.985	1.73 E	1.85	1.12 B	.096 B	5
6	.020 B	.006 B	.028 B	.020 B	6.62 B	2.91	.590	1.03	1.92 E	1.77	1.05 B	.090 B	6
7	.019 B	.006 B	.029 B	.031 B	5.68 B	2.72	.500	1.95	2.10 E	1.69	.957 B	.078 B	7
8	.018 B	.006 B	.030 B	.048 B	5.50 B	2.56	.467	1.78	2.20 E	1.59	.886 B	.068 B	8
9	.017 B	.006 B	.030 B	.061 B	5.60 B	2.62	.457	2.27	2.47 E	1.52	.843 B	.060 B	9
10	.016 B	.007 B	.031 B	.086 B	6.98	2.27	.709	2.27	2.66 E	1.49	.802 B	.050 B	10
11	.016 B	.007 B	.031 B	.093 B	8.68	2.08	.651	2.47	2.85 E	1.44	.893 B	.060 B	11
12	.012 B	.007 B	.032 B	.070 B	9.81	2.07	.706	2.89	3.03 E	1.38	.791 B	.038 B	12
13	.010 B	.008 B	.032 B	.021 B	7.95	2.09	1.21	2.66	3.22 E	1.32	.849 B	.036 B	13
14	.010 B	.008 B	.033 B	.018 B	7.16	2.07	1.06	2.71	3.41 E	1.31	.849 B	.032 B	14
15	.009 B	.008 B	.033 B	.017 B	7.09	2.10	1.13	2.56	3.59 E	1.52	.847 B	.026 B	15
16	.009 B	.008 B	.033 B	.020 B	7.41	1.96	.979	2.30	3.50 E	1.62	.815 B	.028 B	16
17	.008 B	.009 B	.033 B	.032 B	7.51	1.81	.891	2.12	3.01 E	1.60	.784 B	.032 B	17
18	.008 B	.009 B	.032 B	.034 B	7.52	1.68	.755	1.90	3.31 E	1.58	.786 B	.028 B	18
19	.007 B	.009 B	.032 B	.036 B	7.71	1.68	.673	1.68	3.02 E	1.58	.800 B	.028 B	19
20	.007 B	.010 B	.031 B	.040 B	7.88	2.19	.674	1.66	3.02	1.94	.809 B	.020 B	20
21	.007 B	.011 B	.031 B	.048 B	7.88	2.07	.677	1.87	2.98	1.96	.833 B	.018 B	21
22	.006 B	.012 B	.030 B	.060 B	7.88	2.01	.601	1.87	2.83	1.62	.769 B	.018 B	22
23	.006 B	.013 B	.030 B	.090 B	7.81	2.10	.567	.988	2.75	1.45	.895 B	.018 B	23
24	.006 B	.010 B	.029 B	1.21 B	7.58	2.09	.519	.893	2.63	1.42	.871 B	.018 B	24
25	.006 B	.015 B	.029 B	2.66 B	7.08	1.97	.601	.953	2.94	1.38	.854 B	.018 B	25
26	.006 B	.018 B	.027 B	3.05 B	6.79	1.96	.606	1.01	2.67	1.49	.801 B	.016 B	26
27	.006 B	.017 B	.026 B	4.61 B	6.36	1.76	.550	1.07	2.36	1.62	.171 B	.016 B	27
28	.006 B	.018 B	.025 B	5.00 B	5.91	1.58	.620	1.25	2.27	1.59	.151 B	.016 B	28
29	.006 B		.024 B	5.40 B	5.36	1.61	.623	1.51 E	2.23	1.55	.132 B	.016 B	29
30	.006 B		.022 B	6.60 B	4.86	1.85	.621	1.50 E	2.22	1.49	.102 B	.016 B	30
31	.006 B		.020 B		4.41		.620	1.57 E		1.42 B		.016 B	31
TOTAL	.382	.290	.873	30.720	208.51	68.71	20.076	58.621	77.57	49.39	29.899	1.342	TOTAL
MEAN	.012	.009	.028	1.02	6.73	2.29	.677	1.96	2.99	1.59	.693	.043	MEAN
DAYS	31.0	28.5	31.0	30.0	31.0	30.0	29.0	30.0	26.0	31.0	30.0	31.0	DAYS
MAX	.032	.018	.033	9.05	7.88	4.00	1.24	2.89	3.59	2.11	1.40	.118	MAX
MIN	.006	.006	.019	.015	4.41	1.25	.550	.550	1.60	1.31	.102	.016	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, 1.05 M3/S
TOTAL DISCHARGE, 45600 DAM3
MAXIMUM DAILY DISCHARGE, 7.88 M3/S ON MAY 23
MINIMUM DAILY DISCHARGE, .006 M3/S ON JAN 02

MAXIMUM INSTANTANEOUS DISCHARGE, 8.07 M3/S AT 1800 ON MAY 23

A=MANUAL GAUGE
B=ICE CONDITIONS
E=ESTIMATED



3.12

STATION NAME: Horse River at Abasands Park

STATION NUMBER: 07CC001

LOCATION: Latitude 56°42'29", Longitude 111°23'40", NE 08-89-09-W4

DRAINAGE AREA: 842 square miles (2 180 km^2)

PERIOD OF RECORD: The gauge was established on September 25 1975 and discharge data are available on a continuous basis to August 1979, then station was discontinued.

SITE DESCRIPTION: The gauge is located on the right bank approximately two miles (3.2 km) above the confluence with the Athabasca River. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder.

A cableway was completed at this site in September 1976. Prior to that, open water discharge measurements were made by wading or by boat.

GENERAL: This station has been subjected to many acts of vandalism. The last was in August 1979 and resulted in the complete destruction of the station which greatly influenced the decision to discontinue the station.

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CALGARY, ALTA

HORSE RIVER AT ARABANDS PARK

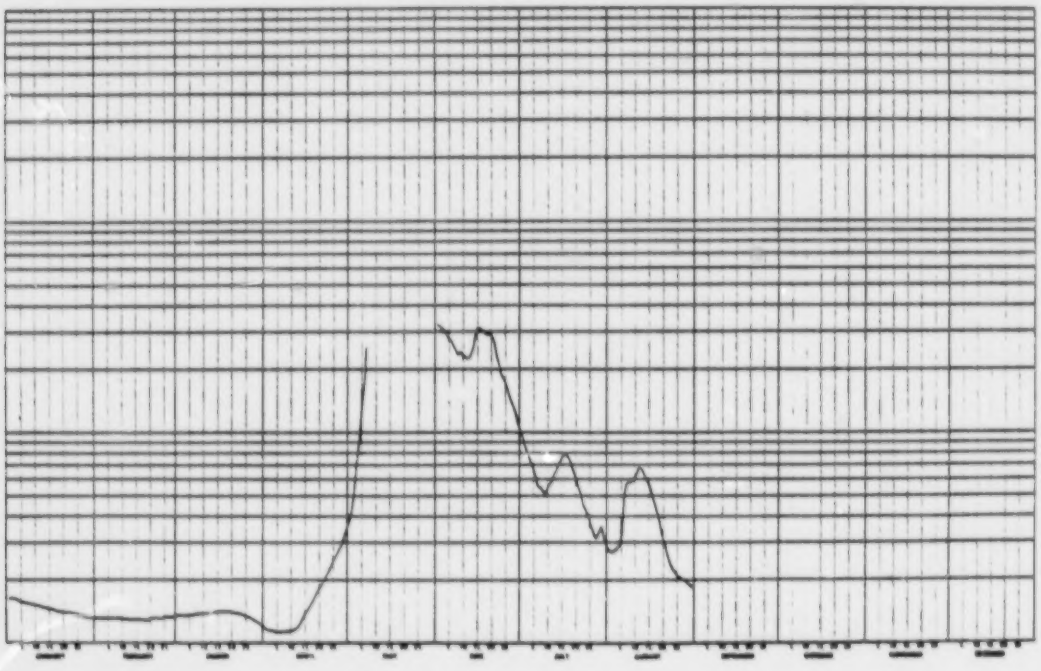
STATION NO. 07EC001

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	1.30 B	.950 B	.750 B	.800 B	6.00 B	33.0 E	9.76	2.71					1
2	1.30 B	.950 B	.750 B	.800 B	6.00 B	32.0 E	8.75	2.69					2
3	1.25 B	.950 B	.750 B	.350 B	6.00 B	31.0 E	7.92	2.75					3
4	1.20 B	.950 B	.750 B	.350 B	8.00 B	30.0 E	7.25	2.82					4
5	1.15 B	.950 B	.750 B	.300 B	13.0 B	28.0 E	6.62	2.87					5
6	1.15 B	.950 B	.750 B	.300 B	18.5 B	27.0 E	6.01	3.92					6
7	1.10 B	.950 B	.750 B	.300 B	25.0 B	25.0 E	5.48	5.62					7
8	1.10 B	.950 B	.800 B	.300 B		23.3 A	5.09	5.78					8
9	1.05 B	.950 B	.800 B	.300 B		24.4	5.16	5.93					9
10	1.05 B	.950 B	.800 B	.350 B		23.2	5.09 A	5.96					10
11	1.03 B	.950 B	.800 B	.371 B		22.5	5.55 E	6.02					11
12	1.00 B	.950 B	.800 B	.400 B		22.3	6.05 E	6.03					12
13	.950 B	.912 B	.830 B	.500 B		23.2	6.50 E	6.58					13
14	.950 B	.900 B	.850 B	.600 B		26.9	7.00 E	6.08					14
15	.950 B	.900 B	.850 B	.800 B		30.0	7.45 E	5.88					15
16	.900 B	.900 B	.850 B	.900 B		31.5	7.94 A	5.23					16
17	.900 B	.900 B	.850 B	1.10 B		30.5	7.75	4.72					17
18	.850 B	.900 B	.850 B	1.30 B		29.1	7.35	4.21					18
19	.850 B	.900 B	.850 B	1.50 B		29.0	6.79	3.88					19
20	.800 B	.900 B	.850 B	1.70 B		29.0	6.10	3.27					20
21	.800 B	.850 B	.850 B	1.90 B		25.8	5.63	2.99					21
22	.800 B	.850 B	.800 B	2.05 B		22.9	5.01	2.98					22
23	.750 B	.850 B	.800 B	2.15 B		20.6	4.61	2.36 A					23
24	.750 B	.850 B	.750 B	2.30 B		18.4	4.24	2.25 E					24
25	.750 B	.700 B	.700 B	2.45 B		17.0	3.91	2.15 E					25
26	.750 B	.700 B	.700 B	2.61 B		15.6	3.68	2.10 E					26
27	.700 B	.700 B	.650 B	2.75 B		14.3	3.16	2.05 E					27
28	.700 B	.700 B	.600 B	2.95 B		13.2	3.12	1.95 E					28
29	.700 B		.550 B	3.30 B		12.2	3.02	1.90 E					29
30	.650 B		.500 B	3.60 B		11.9	3.32	1.80 E					30
31	.650 B		.450 B				2.98	1.75 E					31
TOTAL	28,830	18,012	23,380	38,581		722.0	178.67	118.05					TOTAL
MEAN	.930	.643	.754	1.29		24.1	5.76	3.83					MEAN
DAM3	2490	1560	2020	3330		62400	15400	10300					DAM3
MAX	1.30	.780	.850	3.60		33.0	9.76	6.03					MAX
MIN	.650	.600	.450	.300		11.0	2.98	1.75					MIN

A=MANUAL GAUGE
B=ICE CONDITIONS
E=ESTIMATED

MAXIMUM INSTANTANEOUS DISCHARGE. M3/S AT UA NOT DETERMINED



3.13

STATION NAME: Joslyn Creek near Fort MacKay

STATION NUMBER: 07DA016

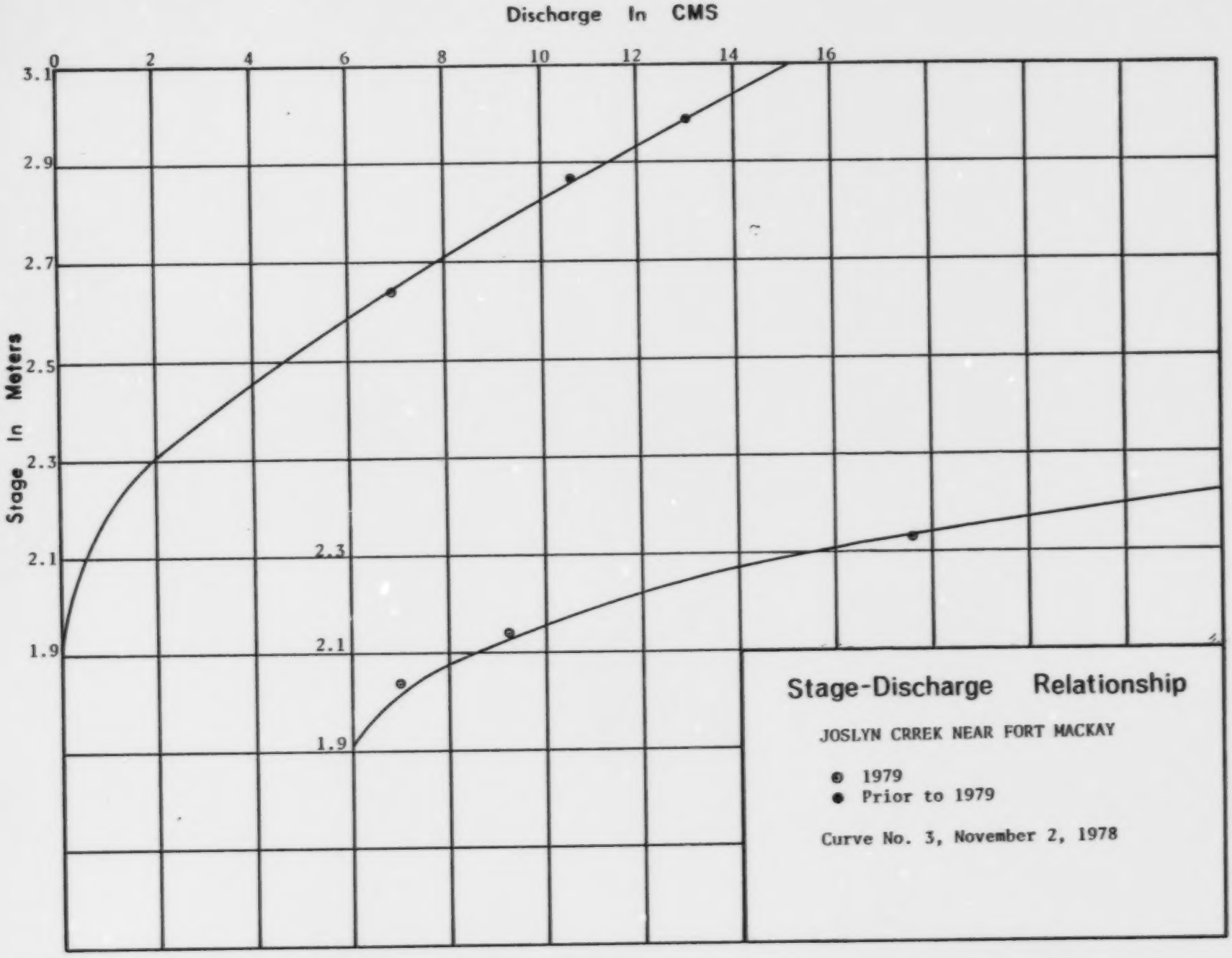
LOCATION: Latitude 57°16'27", Longitude 111°44'30"

DRAINAGE AREA: 93.7 square miles (243 km^2)

PERIOD OF RECORD: The gauge was established on July 28 1975. Discharge data are available on a more-or-less continuous basis to December 1979.

SITE DESCRIPTION: The gauge is located on the left bank approximately two miles (3.2 km) above the confluence with the Ells River and seven air miles (11.3 km) northwest of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made by wading at various locations near the gauge or from the cableway immediately above the gauge.

GENERAL: The stage-discharge relationship at this station is affected by beaver activity.


Discharge In CMS
0
2
4
6
8
10
12
14
16
3.1
2.9
2.7
2.5
2.3
2.1
1.9
Stage In Meters
2.3
2.1
1.9
Stage-Discharge Relationship
JOSLYN CRREK NEAR FORT MACKAY
1979
Prior to 1979
Curve No. 3, November 2, 1978

WATER SURVEY OF CANADA
MAY 16 1980 PAGE 26
CALGARY, ALTA

JOSLYN CREEK NEAR FORT MACKAY

STATION NO. 07DA016

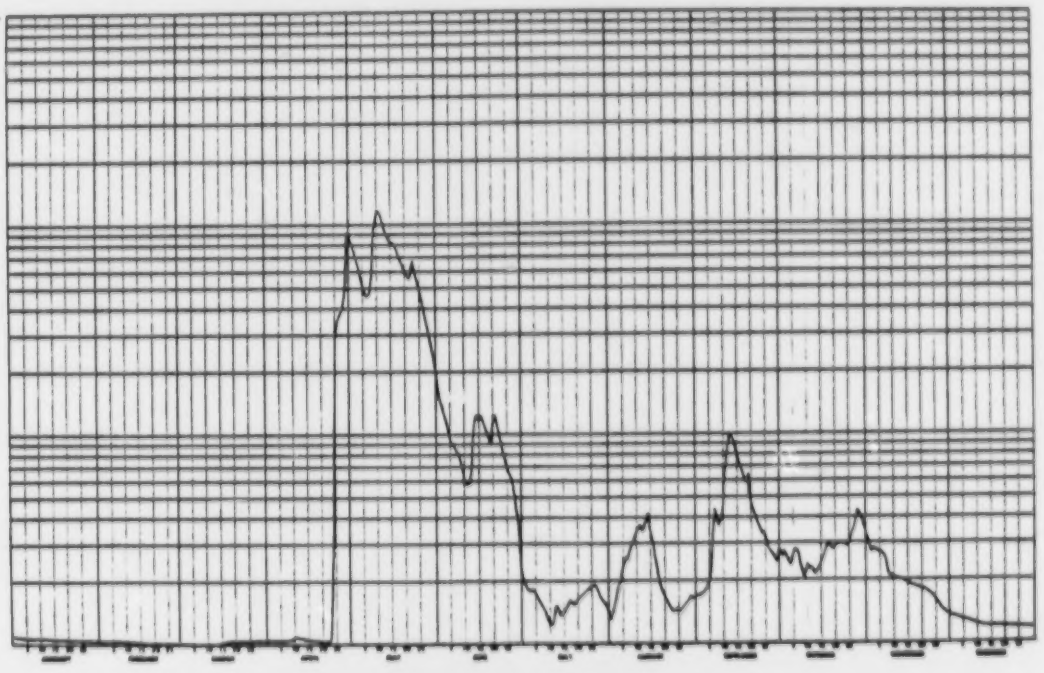
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.021 B	.010 B	.001 B	.011 B	4.30	1.02	.199	.062	.138	.066	.300 B	.072 B	1
2	.020 B	.009 B	.001 B	.011 B	7.34	1.36	.172	.116	.140	.078	.272 B	.064 B	2
3	.019 B	.009 B	.001 B	.011 B	6.05	1.19	.163	.197	.147	.068	.286 B	.066 B	3
4	.018 B	.009 B	.001 B	.011 B	5.96	1.18	.163	.174	.178	.062	.286 B	.062 B	4
5	.018 B	.009 B	.001 B	.012 B	5.21	.989	.150	.056	.199	.078	.275 B	.054 B	5
6	.017 B	.009 B	.001 B	.011 B	4.68	.919	.133	.257	.286	.283	.270 B	.056 B	6
7	.017 B	.009 B	.001 B	.010 B	4.01	.842	.115	.252	.448	.227	.257 B	.054 B	7
8	.017 B	.009 B	.002 B	.015 B	4.68	.912	.098	.298	.362	.231	.217 B	.052 B	8
9	.016 B	.008 B	.002 B	.017 B	7.56	.725	.072	.313	.377	.203	.210 B	.050 B	9
10	.016 B	.008 B	.002 B	.020 B	11.1	.584	.062	.338	.458	.240	.204 B	.048 B	10
11	.016 B	.008 B	.002 B	.018 B	11.0	.570	.056	.368	.771	.228	.203 B	.046 B	11
12	.016 B	.007 B	.002 B	.016 B	11.0	.498	.103	.343	.998	.228	.203 B	.044 B	12
13	.016 B	.007 B	.002 B	.016 B	9.93	1.07	.102	.356	.963	.211	.199 B	.042 B	13
14	.015 B	.006 B	.006 B	.013 B	8.73	1.25	.077	.429	.875	.225	.200 B	.041 B	14
15	.015 B	.006 B	.006 B	.012 B	8.11	1.18	.082	.331	.773	.245	.198 B	.040 B	15
16	.015 B	.006 B	.008 B	.011 B	8.16	1.23	.095	.291	.698	.267	.185 B	.038 B	16
17	.014 B	.005 B	.011 B	.011 B	7.97	1.16	.127	.246	.599	.297	.180 B	.039 B	17
18	.014 B	.005 B	.011 B	.011 B	7.21	.965	.110	.197	.599	.291	.175 B	.039 B	18
19	.014 B	.005 B	.011 B	.011 B	6.85	.919	.189 A	.166	.688	.286	.178 B	.039 B	19
20	.013 B	.006 B	.011 B	.011 B	6.20	1.28	.125 E	.134	.692	.269	.165 B	.039 B	20
21	.013 B	.006 B	.011 B	.011 B	9.02	1.23	.130 E	.116	.689	.300	.160 B	.038 B	21
22	.013 B	.006 B	.011 B	.011 B	9.75	1.07	.105 E	.089	.588	.301	.155 B	.038 B	22
23	.012 B	.005 B	.011 B	.011 B	9.76	.963	.100 E	.087	.568	.297	.150 B	.038 B	23
24	.012 B	.005 B	.011 B	.329 B	9.93	.787	.170 E	.080	.539	.293	.135 B	.038 B	24
25	.012 B	.002 B	.011 B	2.04 B	9.16	.655	.180 E	.091	.539	.287	.125 B	.038 B	25
26	.011 B	.002 B	.011 B	3.58 B	6.01	.672	.190 A	.086	.286	.321	.110 B	.037 B	26
27	.011 B	.002 B	.011 B	3.78 B	5.06	.575	.160	.096	.277	.358	.093 B	.037 B	27
28	.011 B	.001 B	.011 B	4.20 B	3.29	.498	.136	.115	.266	.433	.086 B	.037 B	28
29	.010 B		.011 B	7.19 B	2.76	.368	.116	.135	.263	.417	.080 B	.037 B	29
30	.010 B		.011 B	9.32	2.31	.257	.108	.127	.281	.376	.076 B	.037 B	30
31	.010 B		.011 B		2.03		.078	.138		.338 B		.037 B	31
TOTAL	.452	.170	.292	31.245	199.83	27.288	3.871	6.286	13.297	8.766	5.611	1.488	TOTAL
MEAN	.015	.006	.007	1.04	6.45	.909	.125	.200	.443	.283	.187	.045	MEAN
DAM3	39.1	14.7	17.5	2700	17300	2360	334	536	1150	757	485	122	DAM3
MAX	.021	.010	.011	9.32	11.0	1.02	.190	.420	.998	.433	.300	.072	MAX
MIN	.010	.001	.001	.011	2.03	.257	.052	.062	.138	.203	.076	.037	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, .017 M3/S
TOTAL DISCHARGE, 25800 DAM3
MAXIMUM DAILY DISCHARGE,11.0 M3/S ON MAY 11
MINIMUM DAILY DISCHARGE, .001 M3/S ON FEB 28

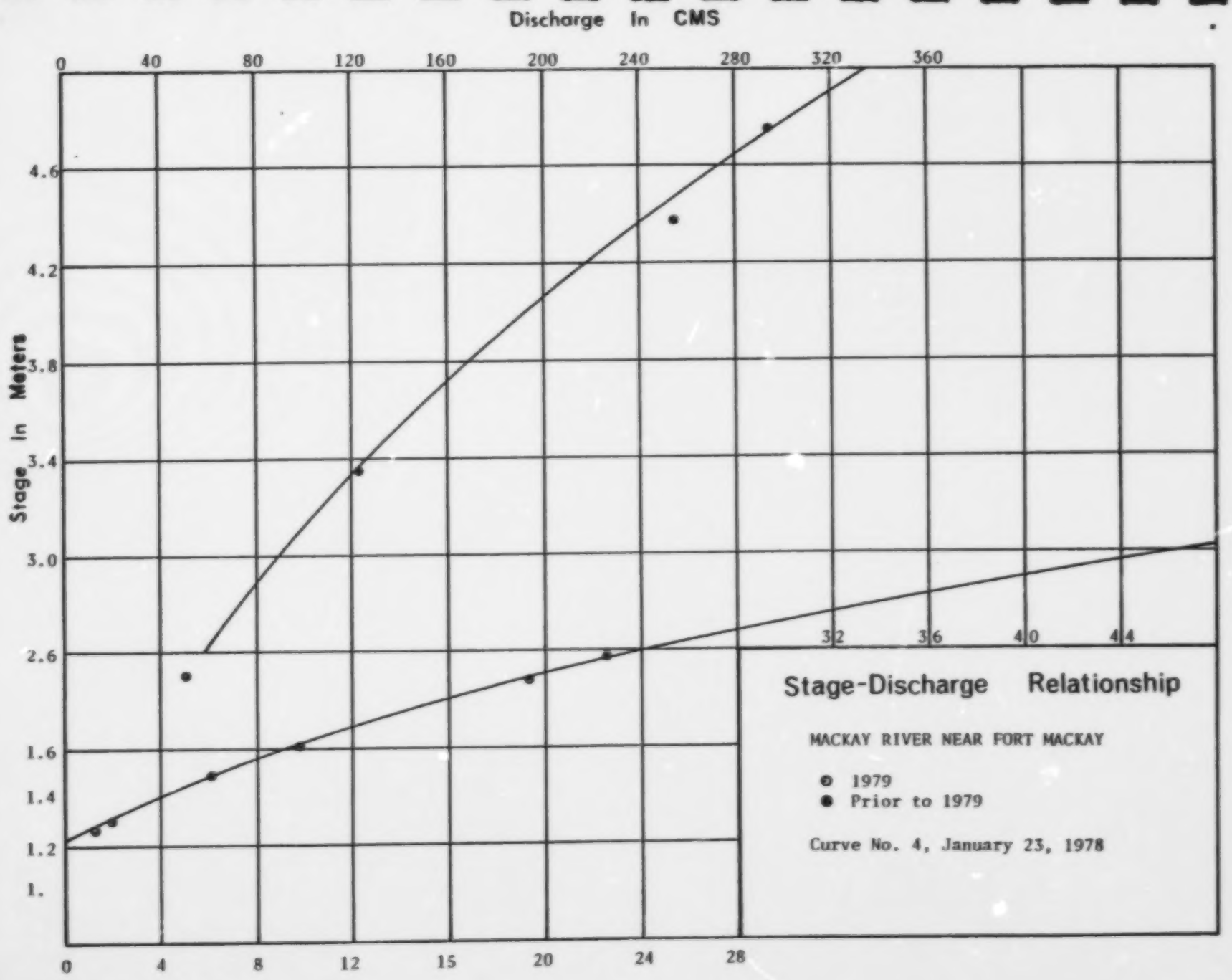
MAXIMUM INSTANTANEOUS DISCHARGE, 12.2 M3/S AT 1515 ON May 10

A=MANUAL GAUGE
B=ICE CONDITIONS
E=ESTIMATED



3.14

STATION NAME:	MacKay River near Fort MacKay
STATION NUMBER:	07DB001
LOCATION:	Latitude 57°12'38", Longitude 111°41'36", SE 03-95-11-W4
DRAINAGE AREA:	2 020 square miles (5 230 km^2)
PERIOD OF RECORD:	This station was established on June 29 1972. Discharge data are available on a continuous basis to December 1979.
SITE DESCRIPTION:	The gauge is located on the left bank approximately five miles (8 km) above the confluence with the Athabasca River and about three air miles (5 km) northwest of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens S-71 water level recorder. A cableway was constructed at this site about 200 feet (60 m) below the gauge in June 1975. Prior to that, discharge measurements were made by boat, wading, or from the Forestry road bridge near the mouth.
GENERAL:	The stage discharge relationship is relatively stable.


Discharge In CMS
0
40
80
120
160
200
240
280
320
360
Stage In Meters
4.6
4.2
3.8
3.4
3.0
2.6
1.6
1.4
1.2
1.
0
4
8
12
15
20
24
28
32
36
40
44
Stage-Discharge Relationship
MACKAY RIVER NEAR FORT MACKAY
1979
Prior to 1979
Curve No. 4, January 23, 1978

WATER SURVEY OF CANADA
MAY 14 1980 PAGE 34
CALGARY, ALTA

MACKAY RIVER NEAR FORT MACKAY

STATION NO. 07DA001

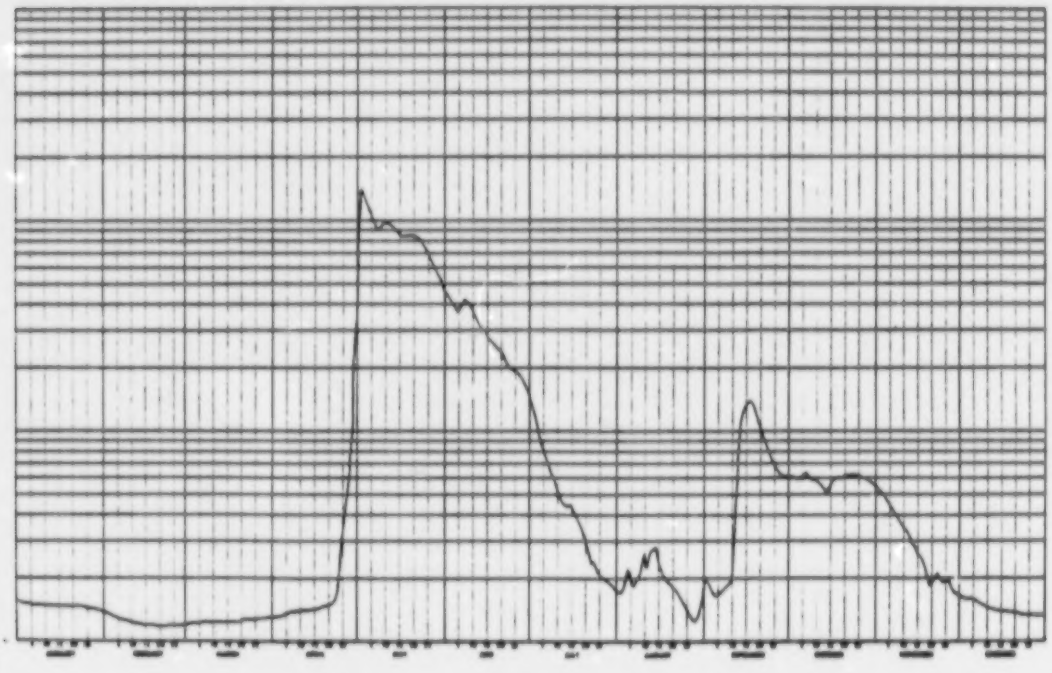
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	1.15 B	.800 B	.500 B	.700 B	89.0 B	45.1	13.8	1.07	1.77	4.18	5.00 B	1.25 B	1
2	1.10 B	.750 B	.500 B	.700 B	142 B	42.8	12.2	1.01	1.46	4.04	5.20 B	1.20 B	2
3	1.10 B	.700 B	.500 B	.716 B	152 B	40.5	10.7	2.25	1.32	5.09	5.00 B	1.20 B	3
4	1.10 B	.700 B	.500 B	.750 B	121 B	38.3	9.26	1.96	1.32	5.06	4.80 B	1.20 B	4
5	1.05 B	.650 B	.500 B	.800 B	111 B	36.9	8.11	1.87	1.36	4.88	4.60 B	1.15 B	5
6	1.05 B	.600 B	.547 B	.800 B	100 B	38.7	7.35	1.85	1.55	4.48	4.30 B	1.10 B	6
7	1.05 B	.600 B	.550 B	.850 B	87.0 B	42.3	6.76	2.03	1.66	4.19	4.10 B	1.05 B	7
8	1.05 B	.600 B	.550 B	.850 B	90.5	41.7	6.49	2.33	1.71	5.03	3.85 B	1.00 B	8
9	1.05 B	.566 B	.550 B	.850 B	91.4	40.2	6.00	2.81	1.94	5.05	3.65 B	.950 B	9
10	1.03 B	.550 B	.550 B	.900 B	98.0	38.8	5.62	2.27	3.43	5.79	3.53 B	.900 B	10
11	1.00 B	.500 B	.550 B	.900 B	98.1	36.7	6.52	2.71	7.62	5.66	3.36 B	.850 B	11
12	1.00 B	.500 B	.550 B	.900 B	95.9	32.8	4.55	2.76	11.6	5.39	3.23 B	.800 B	12
13	1.00 B	.500 B	.550 B	.900 B	94.8	31.4	4.67	2.88	12.6	5.23	2.96 B	.800 B	13
14	1.00 B	.450 B	.550 B	.950 B	90.3	30.0	4.66	2.37	13.5	5.07	2.86 B	.800 B	14
15	1.00 B	.450 B	.550 B	.950 B	87.0	28.4	4.51	2.19	13.9	5.06	2.69 B	.750 B	15
16	1.00 B	.450 B	.550 B	.950 B	83.9	27.6	4.17	2.03	13.7	5.07	2.56 B	.750 B	16
17	1.00 B	.450 B	.550 B	.950 B	81.8	26.7	3.88	1.95	12.8	5.04	2.48 B	.750 B	17
18	1.00 B	.450 B	.550 B	1.00 B	84.6	25.6	3.66	1.78	11.6	5.09	2.21 B	.750 B	18
19	1.00 B	.400 B	.550 B	1.00 B	85.7	24.6	3.18	1.71	10.6	5.08	1.99 B	.750 B	19
20	1.00 B	.400 B	.550 B	1.00 B	84.1	24.4	2.68	1.68	9.57	4.10	1.73 B	.750 B	20
21	1.00 B	.400 B	.600 B	1.10 B	81.7	22.7	2.37	1.67	8.56	4.09	1.84 B	.750 B	21
22	1.00 B	.400 B	.600 B	1.20 B	82.0	20.9	2.01	1.28	8.00	4.18	2.22 B	.700 B	22
23	1.00 B	.450 B	.600 B	1.50 B	80.3	20.0	2.27	1.12	7.58	4.17	1.97 B	.700 B	23
24	1.00 B	.450 B	.600 B	2.35 B	75.9	19.7	2.08	.929	7.18	4.15	1.83 B	.700 B	24
25	.950 B	.450 B	.600 B	3.20 B	71.7	19.7	2.08	.764	6.79	4.12	1.85 B	.700 B	25
26	.950 B	.450 B	.600 B	4.10 B	67.5	19.1	1.99	.583	6.61	4.05 B	1.92 B	.700 B	26
27	.950 B	.450 B	.650 B	5.61 B	63.1	18.5	1.91	.528	6.26	4.00 B	1.72 B	.700 B	27
28	.900 B	.450 B	.650 B	8.00 B	59.1	17.5	1.81	.469	6.17	3.95 B	1.67 B	.700 B	28
29	.900 B		.650 B	11.0 B	55.7	16.5	1.59	.410	6.14	3.85 B	1.35 B	.700 B	29
30	.850 B		.700 B	30.0 B	52.0	15.3	1.49	1.99	6.13	3.75 B	1.30 B	.700 B	30
31	.800 B		.700 B		47.8		1.46	1.98		5.68 B		.700 B	31
TOTAL	31.038	16.966	17.097	85.276	2683.9	890.0	167.77	94.193	203.85	182.78	87.73	24.500	TOTAL
MEAN	1.00	.526	.571	2.84	86.6	29.8	4.77	1.75	6.88	5.90	2.92	.855	MEAN
DAM3	2680	1260	1530	7370	232000	76100	12800	4680	17600	15800	7560	2290	DAM3
MAX	1.15	.800	.700	30.0	142	45.1	13.8	2.86	13.9	6.48	5.68	1.25	MAX
MIN	.800	.400	.500	.700	47.8	15.3	1.46	.528	1.32	3.67	1.30	.700	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE,12.1 M3/S
TOTAL DISCHARGE, 382000 DAM3
MAXIMUM DAILY DISCHARGE, 142 M3/S ON MAY 2
MINIMUM DAILY DISCHARGE, .400 M3/S ON FEB 19

B-ICE CONDITIONS

MAXIMUM INSTANTANEOUS DISCHARGE, M3/S AT ON NOT DETERMINED



3.15

STATION NAME: Muskeg River near Fort MacKay

STATION NUMBER: 07DA008

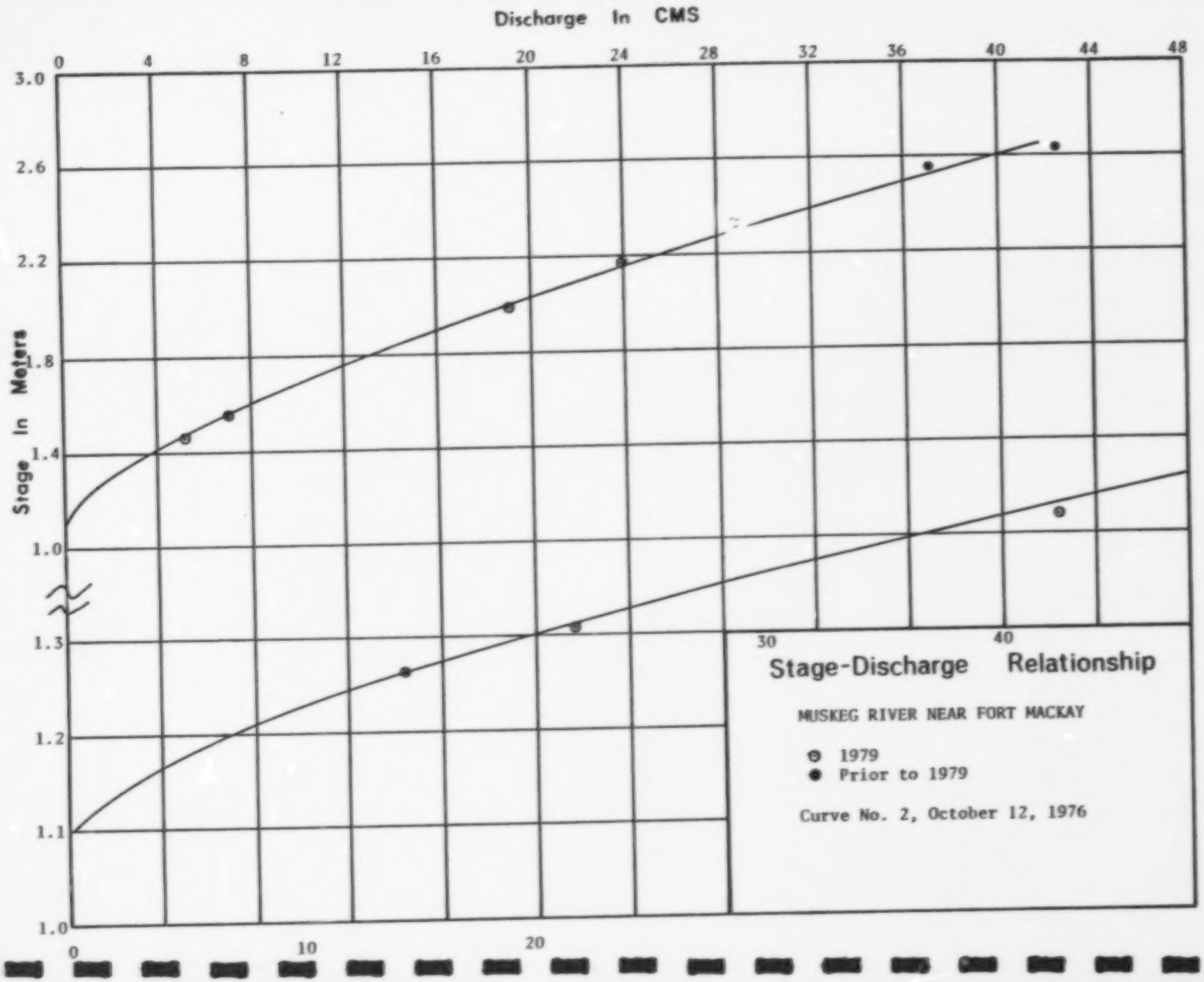
LOCATION: Latitude 57°11'30", Longitude 111°34'05", NE 29-94-10-W4

DRAINAGE AREA: 562 square miles (1 460 km^2)

PERIOD OF RECORD: This station was established on November 5 1973. Discharge data are available from January 1974 to December 1979.

SITE DESCRIPTION: The gauge is located on the left bank about seven miles (11 km) above the confluence with the Athabasca River and two and one-half air miles (4 km) east of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made by wading or from the cableway 50 feet (15 m) above the gauge.

GENERAL:


Discharge In CMS
0
4
8
12
16
20
24
28
32
36
40
44
48
3.0
2.6
2.2
1.8
1.4
1.0
Stage In Meters
1.3
1.2
1.1
1.0
0
10
20
30
40
Stage-Discharge Relationship
MUSKEG RIVER NEAR FORT MACKAY
1979
Prior to 1979
Curve No. 2, October 12, 1976

WATER SURVEY OF CANADA
MAY 16 1980 PAGE 8
CALGARY, ALTA

HUBBLE RIVER NEAR FORT MACKAY

STATION NO. 07DA002

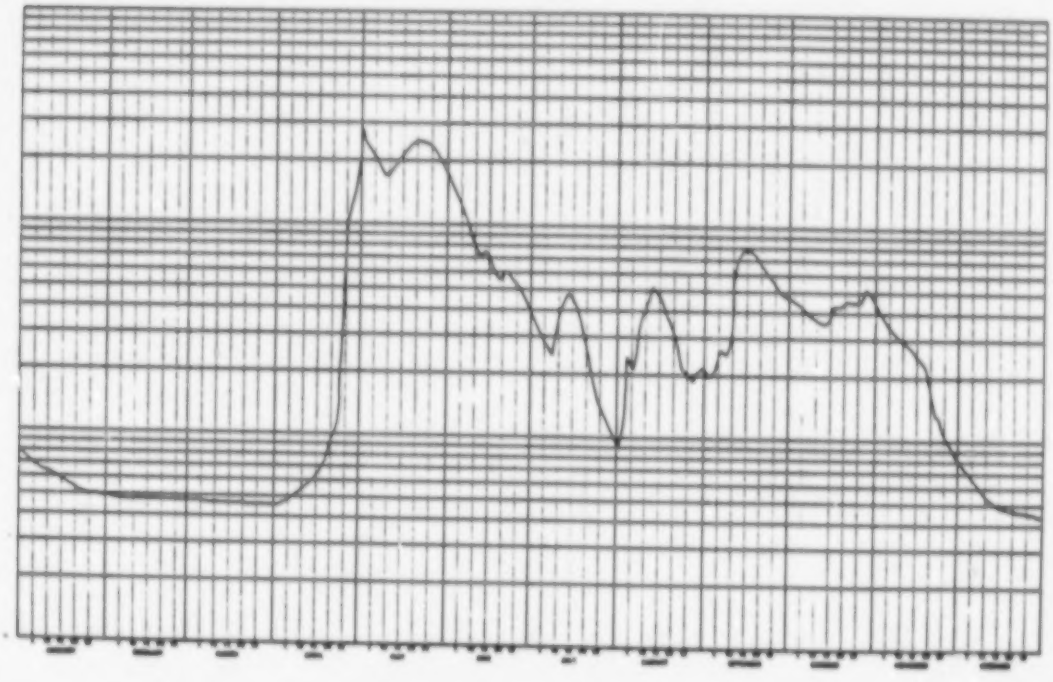
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.780 B	.580 B	.680 B	.660 B	28.2	10.5	3.72	.922	2.04	0.66	0.88 B	.780 B	1
2	.780 B	.570 B	.680 B	.650 E	24.6	15.0	3.66	1.01	1.99	0.56	0.88 B	.780 B	2
3	.780 B	.570 B	.680 B	.670 B	23.6	14.3	3.12 A	1.06	2.01	0.58	0.88 B	.780 B	3
4	.720 B	.570 B	.680 B	.680 B	22.0	13.2	3.00 E	2.06	2.06	0.35	0.88 B	.780 B	4
5	.780 B	.690 B	.680 B	.690 B	21.1	12.0	2.85 E	2.29	2.50	0.19	0.85 B	.680 B	5
6	.680 B	.690 B	.670 B	.580 B	19.8	11.6	2.70 E	2.19	2.03	0.06	0.88 B	.830 B	6
7	.670 B	.684 B	.670 B	.510 B	18.6	10.9	2.55 E	2.06	2.57	0.06	0.88 B	.680 B	7
8	.665 B	.680 B	.670 B	.520 B	17.0	9.96	2.85 E	3.08	2.56	0.06	0.88 B	.590 B	8
9	.631 B	.680 B	.670 B	.530 B	16.7	8.91	2.98 E	3.07	2.05	0.71	0.88 B	.570 B	9
10	.600 B	.680 B	.670 B	.540 B	16.0	8.07	3.00 E	3.06	2.08	0.88	0.95 B	.550 B	10
11	.630 B	.680 B	.670 B	.550 B	17.5	7.62	0.00 E	4.06	5.08	3.06	0.98 B	.540 B	11
12	.620 B	.680 B	.670 B	.560 B	18.0	7.35	0.00 E	5.02	7.09	3.59	0.88 B	.520 B	12
13	.610 B	.680 B	.670 B	.580 B	18.0	7.00	0.00 E	5.22	7.05	3.56	0.72 B	.510 B	13
14	.600 B	.680 B	.670 B	.600 B	19.1	7.53	0.00 E	4.98	7.09	3.56	0.51 B	.580 B	14
15	.590 B	.680 B	.670 B	.620 B	20.2	7.19	0.00 E	4.75	7.79	3.91	0.66 B	.690 B	15
16	.580 B	.680 B	.670 B	.650 B	21.2	6.84	0.30 E	4.01	7.83	4.32	0.81 B	.690 B	16
17	.570 B	.680 B	.670 B	.700 B	22.4	6.18	3.98 E	4.16	7.71	4.05	0.36 B	.680 B	17
18	.560 B	.680 B	.670 B	.750 B	23.5	5.70	3.06 E	3.88	7.56	4.03	0.20 B	.680 B	18
19	.550 B	.680 B	.670 B	.800 B	24.3	5.08	3.08 E	3.58	7.16	4.07	0.08 B	.670 B	19
20	.540 B	.680 B	.670 B	.900 B	24.9	4.70	2.65 E	3.14	6.78	4.38	1.70 B	.670 B	20
21	.530 B	.680 B	.670 B	1.00 B	25.1	4.11	2.35 E	2.83	6.65	4.38	1.42 B	.670 B	21
22	.520 B	.680 B	.660 B	1.10 B	24.9	3.90	2.05 E	2.58	6.16	4.58	1.38 B	.660 B	22
23	.520 B	.680 B	.660 B	1.42 B	24.0	3.70	1.88 E	2.22	5.95	4.58	1.29 B	.660 B	23
24	.510 B	.680 B	.660 B	2.80 B	24.0	3.52	1.68 E	2.08	5.75	4.09	1.11 B	.660 B	24
25	.510 B	.680 B	.660 B	5.20 B	23.7	3.22	1.66 E	2.06	5.65	4.66	1.05 B	.660 B	25
26	.510 B	.680 B	.660 B	10.0 B	23.1	3.09	1.37 A	1.96	5.19	4.63	1.00 B	.650 B	26
27	.510 B	.680 B	.660 B	12.0 B	22.8	4.86	1.09	1.88	5.01	5.16	.960 B	.650 B	27
28	.510 B	.680 B	.660 B	13.5 B	21.8	6.52	1.16	1.99	4.93	5.16	.899 B	.650 B	28
29	.500 B		.660 B	16.0 B	20.8	6.22	1.09	2.06	4.92	4.98	.850 B	.660 B	29
30	.500 B		.660 B	20.0 B	18.9	6.00	1.06	2.10	4.89	4.84	.820 B	.660 B	30
31	.500 B		.660 B		17.7		.963	2.17		4.89		.660 B	31
TOTAL	19,471	13,510	18,529	9a,889	666.8	238.75	86,133	90,682	152.13	133.05	99,419	18,560	TOTAL
MEAN	.628	.483	.598	3.16	21.6	7.96	2.78	2.93	5.07	4.29	2.31	.534	MEAN
DAM3	1000	1170	1200	8180	57400	20000	7400	7830	13100	11500	6000	1430	DAM3
MAX	.780	.580	.680	20.0	28.2	16.5	4.85	5.22	7.83	5.16	4.28	.780	MAX
MIN	.500	.680	.660	.650	16.7	6.00	.963	.922	1.99	3.54	.820	.660	MIN

SUMMARY FOR THE MONTHS JAN TO DEC
MEAN DISCHARGE, 6.14 M3/S
TOTAL DISCHARGE, 136000 DAM3
MAXIMUM DAILY DISCHARGE,28.2 M3/S ON MAY 1
MINIMUM DAILY DISCHARGE, .660 M3/S ON DEC 29

MAXIMUM INSTANTANEOUS DISCHARGE, 30.A M3/S AT 0000 ON May 1

A-MANUAL GAUGE
B-ICE CONDITIONS
E-ESTIMATED



3.16

STATION NAME: Poplar Creek near Fort McMurray

STATION NUMBER: 07DA007

LOCATION: Latitude 56°54'50", Longitude 111°27'35", NE 24-91-10-W4

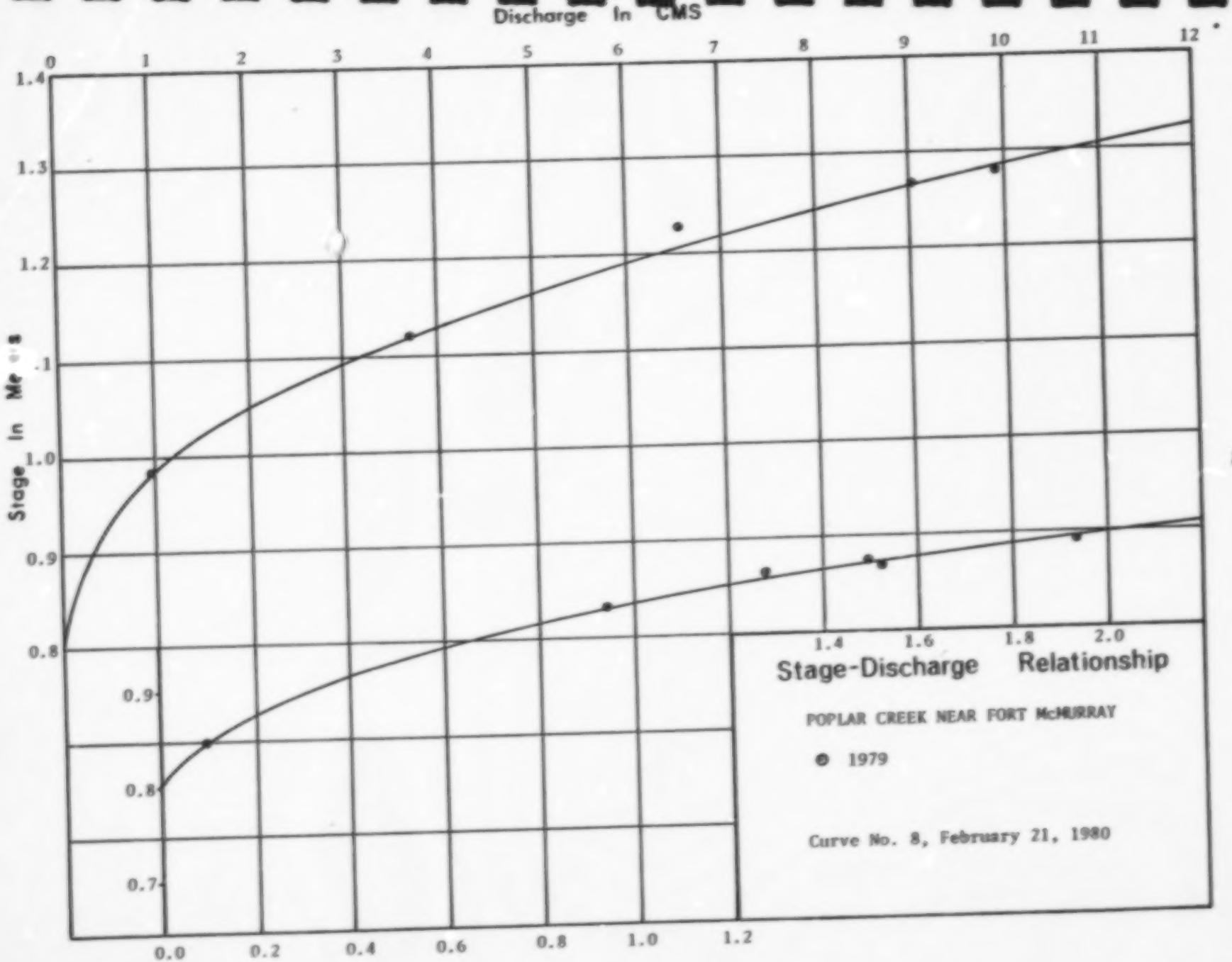
DRAINAGE AREA:

PERIOD OF RECORD: This station was established on November 10, 1972. Miscellaneous discharge data are available during 1972 and continuous discharge data are available from January 1973 to December 1979.

SITE DESCRIPTION: The gauge was located on the left bank 160 feet (49 m) above Highway 63 until August 14 1975, at which time the gauge was removed due to construction activities in the channel. The gauge was relocated on April 16 1976, 200 feet (60 m) below the new bridge on the right bank. This station is equipped with a float-operated Stevens A-71 water level recorder.

Open-water measurements were made by wading or from the cableway prior to the location change and are presently made by wading or from the highway bridge.

GENERAL: Channel improvements were made to allow for the diversion of the Beaver River. Water from this diversion appears to have started to flow down the Poplar Creek in mid-July 1976.


Discharge In CMS
0 1 2 3 4 5 6 7 8 9 10 11 12
1.4
1.3
1.2
1.0
0.9
0.8
0.9
0.8
0.7
0.0 0.2 0.4 0.6 0.8 1.0 1.2
1.4 1.6 1.8 2.0
Stage-Discharge Relationship
POPLAR CREEK NEAR FORT McMURRAY
1979
Curve No. 8, February 21, 1980

WATER SURVEY OF CANADA
MAY 16 1980 PAGE 9
CALGARY, ALTA

POPLAR CREEK NEAR FORT MCMURRAY

STATION NO. 07DA007

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

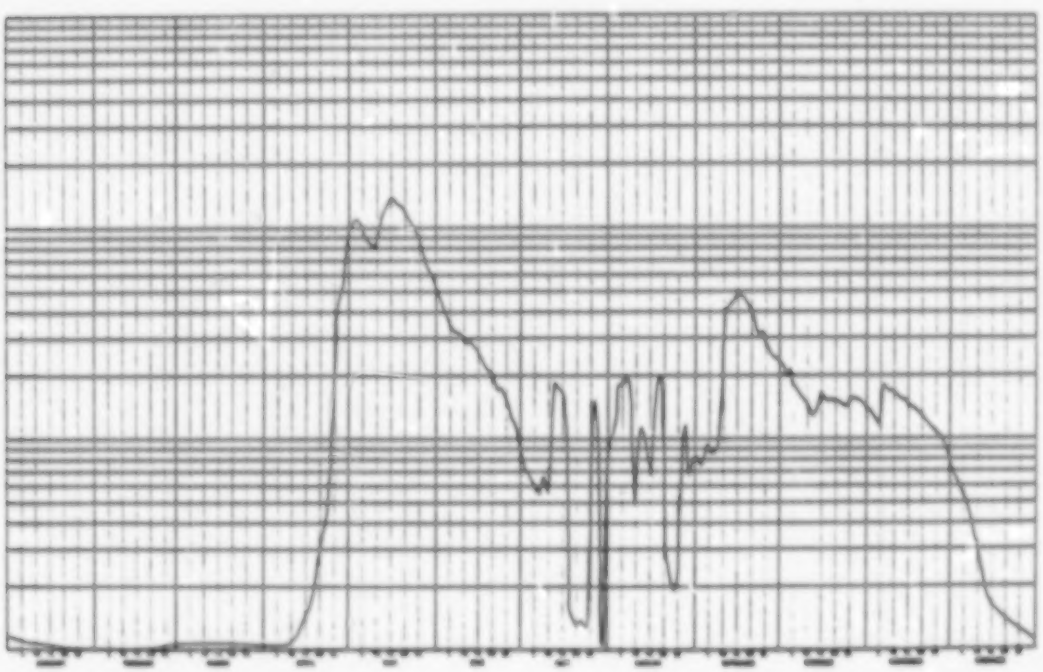
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.029 B	B	.013 B	.011 B	10.2 B	6.06	.807	.893	.805	2.03	1.57	.730 B	1
2	.028 B	B	.016 B	.011 B	10.9 B	5.07	.782	.191	.766	2.03	1.58	.676 B	2
3	.024 B	B	.016 B	.011 B	10.9 B	4.11	.710	1.17	.757	1.98	1.58	.620 B	3
4	.022 B	B	.016 B	.010 B	10.8 B	3.91	.679	1.81	.672	2.19	1.83	.580 B	4
5	.021 B	B	.016 B	.010 B	10.2 B	3.72	.638	1.82	.941	1.86	1.17	.550 B	5
6	.020 B	B	.016 B	.010 B	9.82 B	3.91	.591	1.80	.895	1.77	1.57	.520 B	6
7	.019 B	B	.016 B	.010 B	9.62 B	3.24	.566	1.96	.854	1.66	1.88	.481 B	7
8	.018 B	B	.016 B	.011 B	9.15 B	3.24	.609	1.91	.879	1.58	1.73	.420 B	8
9	.017 B	B	.016 B	.013 B	7.96 B	3.18	.661	1.83	1.31	1.69	1.68	.366 B	9
10	.017 B	B	.016 B	.017 B	8.80	2.95	.593	.879	2.07	1.50	1.97	.316 B	10
11	.016 B	B	.016 B	.020 B	9.60	2.82	1.26	.943	2.13	1.60	1.68	.276 B	11
12	.015 B	B	.016 B	.060 B	11.1	2.99	1.05	1.10	2.36	1.51	1.59	.240 B	12
13	.014 B	.001 B	.016 B	.055 B	12.8	2.83	1.01	1.09	2.38	1.51	1.56	.208 B	13
14	.012 B	.001 B	.016 B	.070 B	12.8	2.75	1.76	.963	2.63	1.50	1.55	.170 B	14
15	.010 B	.002 B	.016 B	.090 B	13.6	2.95	1.68	.796	2.78	1.69	1.67	.140 B	15
16	.009 B	.002 B	.016 B	.110 B	13.7	2.61	1.41	.882	2.83	1.95	1.63	.125 B	16
17	.008 B	.003 B	.016 B	.142 B	12.9	2.28	1.04	1.09	2.73	1.51	1.62	.115 B	17
18	.007 B	.005 B	.016 B	.180 B	12.8	2.16	.198	1.98	2.53	1.50	1.59	.105 B	18
19	.006 B	.006 B	.016 B	.230 B	12.5	2.11	.886	1.91	2.39	1.50	1.56	.096 B	19
20	.005 B	.008 B	.016 B	.200 B	12.0	1.98	.866	.965	2.01	1.96	1.59	.090 B	20
21	.005 B	.009 B	.016 B	.300 B	11.4	1.88	.869	.297	3.78	1.51	1.25	.086 B	21
22	.006 B	.008 B	.016 B	.400 B	10.8	1.76	.876	.230	3.54	1.98	1.21	.073 B	22
23	.006 B	.007 B	.015 B	.605 B	10.0	1.75	.870	.209	3.36	1.96	1.17	.067 B	23
24	.003 B	.006 B	.013 B	.900 B	9.98	1.74	.856	.191	3.13	1.66	1.13	.060 B	24
25	.003 B	.009 B	.013 B	1.50 B	9.09	1.59	.363	.208	2.84	1.42	1.11	.055 B	25
26	.002 B	.010 B	.013 B	2.80 B	8.13	1.48	1.24	.370	2.79	1.50	1.05	.050 B	26
27	.002 B	.011 B	.012 B	4.65 B	6.84	1.28	1.96	1.02	2.93	1.56	1.04	.045 B	27
28	.002 B	.012 B	.012 B	5.02 B	6.98	1.20	.867	1.19	2.66	1.50	1.01 A	.040 B	28
29	.001 B		.012 B	7.32 B	6.20	1.66	.815	.962	2.61	1.51	.956 B	.035 B	29
30	.001 B		.011 B	8.66 B	5.76	.980	.806	.766	2.52	1.68	.820 B	.030 B	30
31	.001 B		.011 B		5.21		.765	.814		1.61		.026 B	31
TOTAL	.382	.098	.417	83.700	307.70	70.588	22.864	31.037	60.921	69.60	40.380	7.156	TOTAL
MEAN	.011	.003	.013	1.12	9.93	2.35	.738	1.00	2.03	1.60	1.35	.231	MEAN
CSMS	29.5	7.60	32.0	2920	20000	6610	1980	2680	7300	4290	3090	035	CSMS
MAX	.029	.012	.016	9.00	13.7	6.06	1.96	1.98	3.83	2.63	1.88	.730	MAX
MIN	.001	0	.011	.010	5.21	.980	.000	.101	.757	1.51	.820	.026	MIN

SUMMARY FOR THE MONTHS JAN TO DEC

MEAN DISCHARGE, 1.70 M3/S
TOTAL DISCHARGE, 5668 DAMS
MAXIMUM DAILY DISCHARGE,13.7 M3/S ON MAY 10
MINIMUM DAILY DISCHARGE, .0 M3/S ON FEB 1

A=ESTIMATED VALUES
B=ICE CONDITIONS

MAXIMUM INSTANTANEOUS DISCHARGE, 14.0 M3/S AT 1980 HR ON MAY 11



3.17

STATION NAME: Richardson River near the Mouth

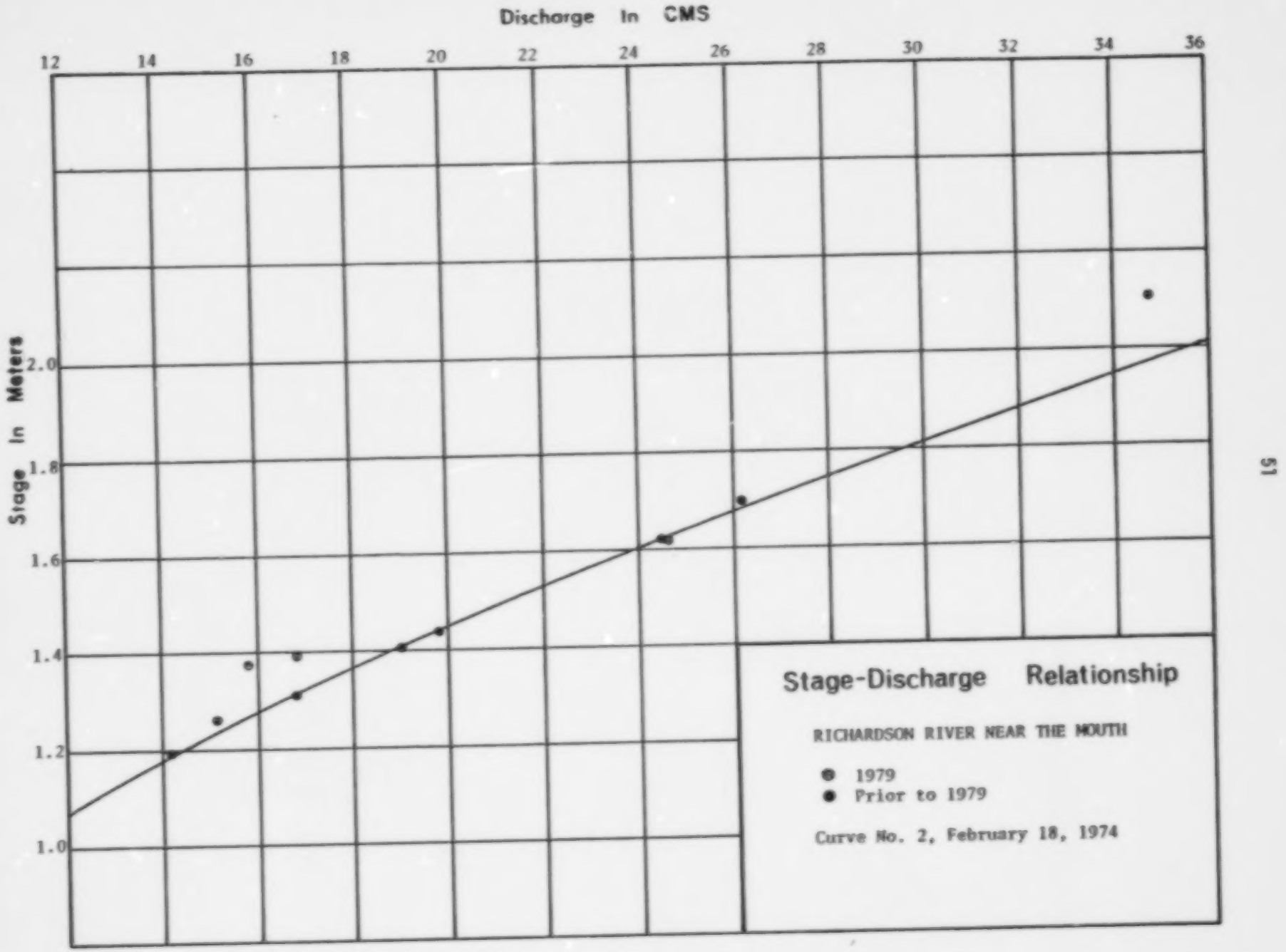
STATION NUMBER: 07DD002

LOCATION: Latitude 58°21'48", Longitude 111°14'14"

DRAINAGE AREA: 1 140 square miles (2 950 km^2)

PERIOD OF RECORD: This station was established June 14 1970. Discharge data are available on a continuous basis to December 1979.

SITE DESCRIPTION: The gauge is located on the right bank approximately seven and one-half miles (12 km) above the confluence with the Athabasca River and 25 air miles (40 km) south of Fort Chipewyan. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are made by boat at the gauge.


Discharge In CMS
12
14
16
18
20
22
24
26
28
30
32
34
36
Stage In Meters
2.0
1.8
1.6
1.4
1.2
1.0
Stage-Discharge Relationship
RICHARDSON RIVER NEAR THE MOUTH
1979
Prior to 1979
Curve No. 2, February 18, 1974

WATER SURVEY OF CANADA
MAY 16 1980 PAGE 19
CALGARY, ALTA

DISCHARGE RIVER NEAR THE MOUTH

STATION NO. 07DB002

(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

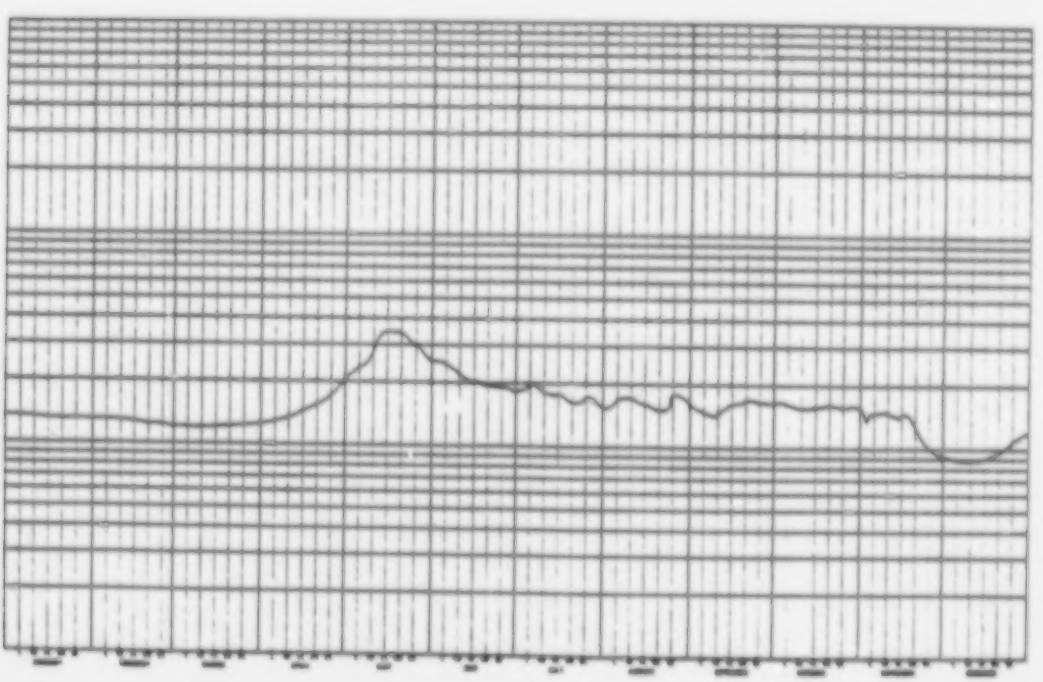
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	13.0 B	13.0 B	12.1 B	12.7 B	29.0 B	25.0	18.5	15.1	15.0	14.7	15.5 B	9.20 B	1
2	13.0 B	13.0 B	12.1 B	12.8 B	31.5 B	25.1	18.4	15.1	15.0	14.6	13.0 B	9.10 B	2
3	13.0 B	13.0 B	12.1 B	12.8 B	33.1 B	25.0	18.0	15.0	15.1	14.6	14.0 B	9.00 B	3
4	13.0 B	13.0 B	12.1 B	12.9 B	33.6 B	25.1	18.0	14.9	15.1	14.6	14.0 B	8.90 B	4
5	13.0 B	13.0 B	12.1 B	13.0 B	33.9 B	24.9	18.1	14.9	15.1	14.5	14.0 B	8.90 B	5
6	13.0 B	13.0 B	12.0 B	13.1 B	33.3 B	24.6	19.0	17.2	14.7	14.8	14.0 B	8.90 B	6
7	13.0 B	13.0 B	12.0 B	13.2 B	33.0 B	23.8	20.2	17.3	14.6	15.0	14.0 B	8.90 B	7
8	13.0 B	13.0 B	12.0 B	13.3 B	34.3 B	23.0	19.6	17.2	14.5	15.0	15.0 B	8.90 B	8
9	13.0 B	13.0 B	12.0 B	13.4 B	35.5 B	23.0	18.7	17.3	14.3	15.7	15.0 B	8.90 B	9
10	13.3 B	13.0 B	12.0 B	13.5 B	37.0 E	22.6	18.5	17.1	14.5	15.6	15.0 B	8.90 B	10
11	13.3 B	12.9 B	12.0 B	13.6 B	39.5 E	21.6	18.2	17.3	15.0	15.5	14.7 B	8.90 B	11
12	13.3 B	12.9 B	12.0 B	13.7 B	42.0 E	21.1	17.9	16.9	15.3	15.5	14.6 B	8.90 B	12
13	13.2 B	12.8 B	12.0 B	13.9 B	43.5 E	20.8	17.7	16.6	15.6	15.0	14.5 B	8.90 B	13
14	13.2 B	12.8 B	12.0 B	14.1 B	44.0 E	20.5	17.7	16.2	15.6	15.7	15.1 B	8.90 B	14
15	13.1 B	12.7 B	12.1 B	14.3 B	44.5 E	20.4	17.8	16.1	15.6	15.7	15.7 B	9.00 B	15
16	13.1 B	12.7 B	12.1 B	14.5 B	44.8 E	20.5	18.0	16.1	15.3	15.8	15.9 B	9.00 B	16
17	13.1 B	12.6 B	12.1 B	14.7 B	44.0	20.1	17.7	15.8	15.6	15.9	15.7 B	9.10 B	17
18	13.1 B	12.6 B	12.1 B	14.9 B	43.0	19.8	17.5	15.6	15.6	16.0	15.6 B	9.30 B	18
19	13.1 B	12.5 B	12.2 B	15.1 B	42.0	19.5	17.5	15.5	15.6	16.2	15.5 B	9.60 B	19
20	13.1 B	12.5 B	12.2 B	15.3 B	41.0	19.4	17.6	15.3	15.8	16.5	15.3 B	9.80 B	20
21	13.1 B	12.5 B	12.2 B	15.6 B	40.0	19.3	18.1	15.1	17.1	16.2	15.0 B	9.70 B	21
22	13.1 B	12.6 B	12.3 B	15.9 B	39.0	19.2	18.3	15.0	17.1	16.2	11.0 B	10.0 B	22
23	13.1 B	12.6 B	12.3 B	16.3 B	38.0	19.0	18.6	15.1	17.0	16.1	10.9 B	10.2 B	23
24	13.1 B	12.6 B	12.3 B	16.6 B	38.0	19.7	19.0	15.7	16.7	15.9	10.6 B	10.5 B	24
25	13.1 B	12.5 B	12.4 B	17.1 B	38.0	19.8	17.8	17.9	16.0	15.8	10.2 B	10.7 B	25
26	13.1 B	12.3 B	12.4 B	17.5 B	39.0	19.0	17.9	18.0	16.8	15.8	9.90 B	11.0 B	26
27	13.1 B	12.2 B	12.5 B	18.1 B	39.0	19.1	17.9	18.0	16.7	15.8	9.70 B	11.0 B	27
28	13.0 B	12.2 B	12.5 B	18.7 B	38.0	19.0	17.8	17.7	16.6	15.8	9.50 B	11.0 B	28
29	13.0 B		12.6 B	19.4 B	37.0	19.0	17.8	17.6	16.7	15.9	9.40 B	11.0 B	29
30	13.0 B		12.6 B	20.0 B	36.0	18.9	18.0	17.0	16.7	15.9	9.30 B	10.8 B	30
31	13.0 B		12.7 B		35.5		18.9	16.9	16.6	15.9		10.1 B	31
TOTAL	410.1	355.7	378.1	488.0	994.7	637.0	566.1	509.8	478.1	490.8	399.60	301.80	TOTAL
MEAN	13.2	12.7	12.2	15.8	35.9	21.2	17.7	16.4	15.9	15.8	13.3	9.72	MEAN
RUNS	15000	30700	32700	38900	77500	55100	47000	44000	41300	42000	34500	29000	RUNS
MAX	13.3	13.0	12.7	20.0	44.8	25.1	20.2	18.0	17.1	16.8	15.9	12.1	MAX
MIN	13.0	12.2	12.0	12.7	20.8	18.9	15.9	15.0	14.3	14.5	9.30	8.80	MIN

SUMMARY FOR THE MONTHS JAN TO DEC

MEAN DISCHARGE, 124.1 M3/S
TOTAL DISCHARGE, 4000000 DAM3
MAXIMUM DAILY DISCHARGE, 44.8 M3/S ON MAY 17
MINIMUM DAILY DISCHARGE, 8.80 M3/S ON DEC 7

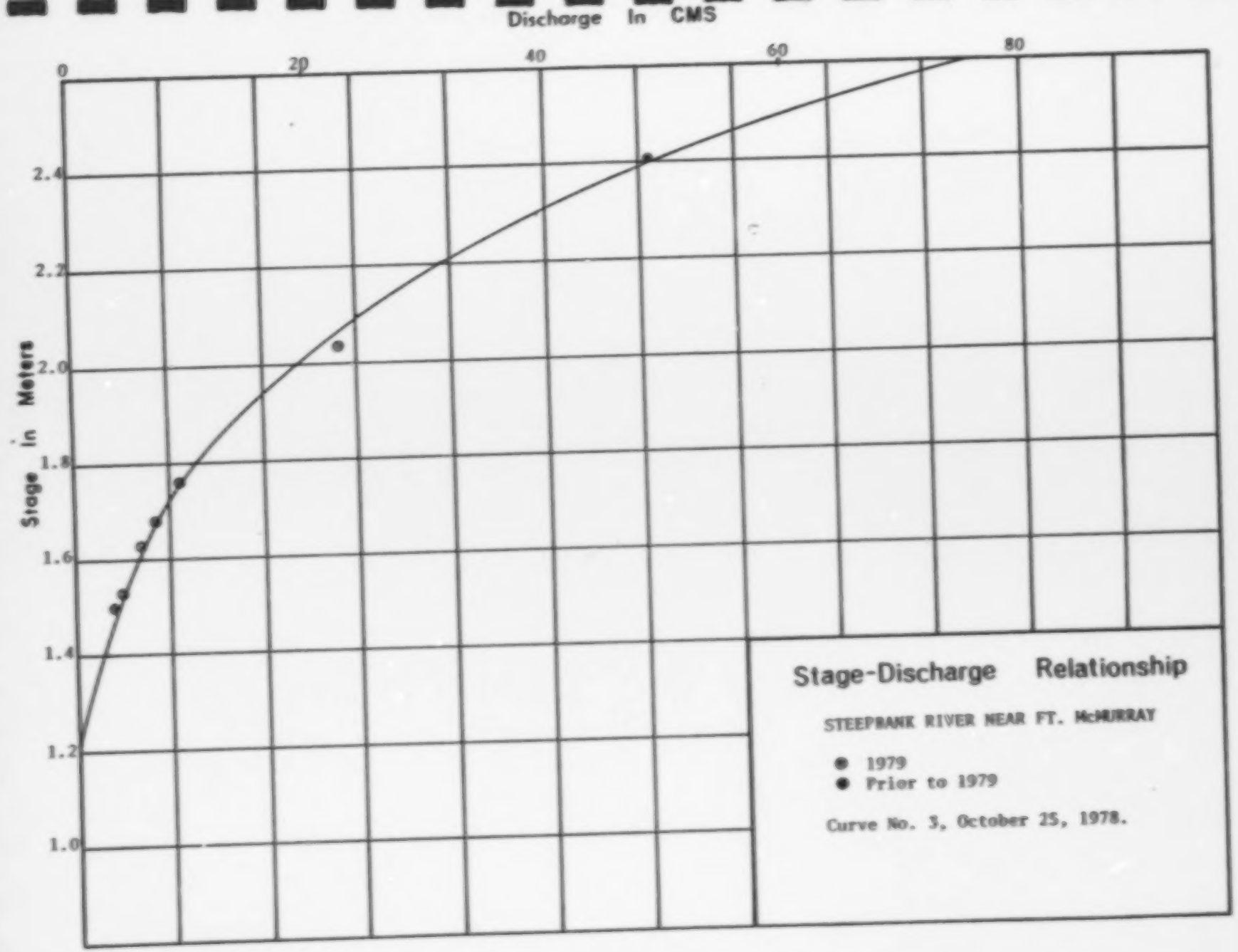
MAXIMUM INSTANTANEOUS DISCHARGE, 35.0 M3/S AT 1615 ON May 17

ANNUAL GAUGE
DATA CONDITIONS
ESTIMATED



3.18

STATION NAME:	Steepbank River near Fort McMurray
STATION NUMBER:	07DA006
LOCATION:	Latitude 57°00'17", Longitude 111°24'53", SW 29-92-09-W4
DRAINAGE AREA:	530 square miles (1 370 km^2)
PERIOD OF RECORD:	This station was established on September 20 1972. Miscellaneous discharges are available for 1972 and 1973. Continuous discharge data are available from January 1974 to December 1979.
SITE DESCRIPTION:	The gauge was initially established on the left bank approximately four and one-half miles (7.2 km) above the confluence with the Athabasca River and 15 air miles (24 km) south-east of Fort MacKay. On September 19 1975, the gauge was moved directly across the river. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder. Open-water discharge measurements are presently made by wading or from the cable-way. Prior to the construction of the cableway in June 1975 measurements were made by boat.
GENERAL:	The high, steep, left bank made it difficult to keep the orifice line in place so that con-siderable lost record occurred, particularly during high flows. Hence the gauge was re-located on the right bank in 1975.


Discharge In CMS
0
20
40
60
80
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
Stage in Meters
Stage-Discharge Relationship
STEEPBANK RIVER NEAR FT. McMURRAY
1979
Prior to 1979
Curve No. 3, October 25, 1978.

[illegible] SURVEY OF CANADA
OCT 16 1980 PAGE 31
CALGARY, ALTA

[illegible] FLOW MEASUREMENT [illegible] STATION NO. 07DD005

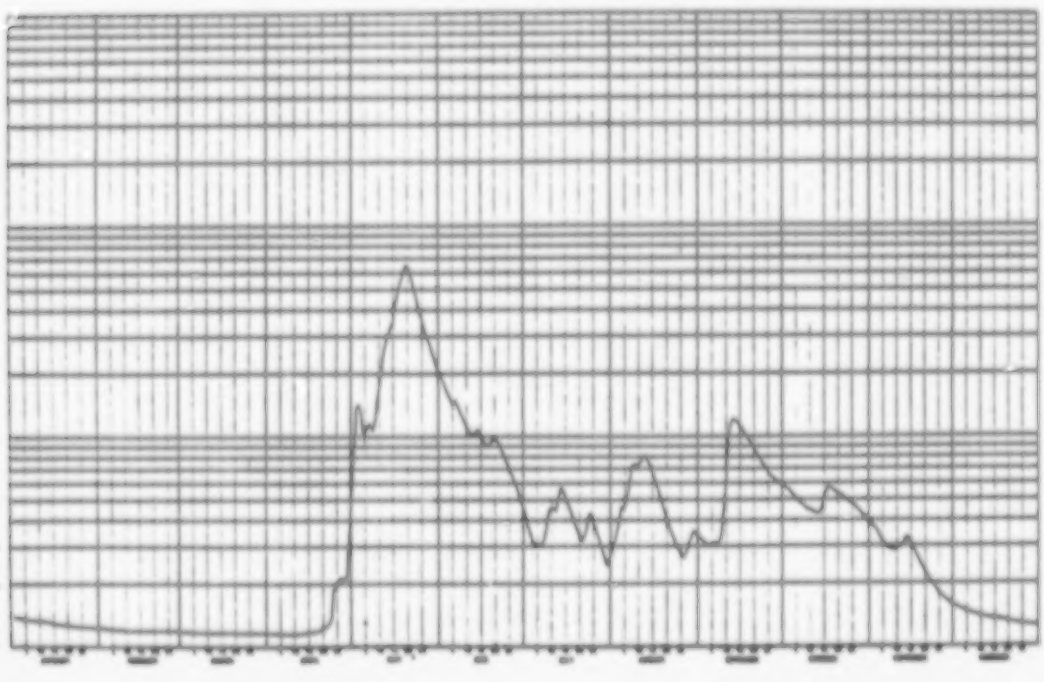
(PRELIMINARY) DAILY DISCHARGE IN CUBIC METRES PER SECOND FOR 1979

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	DAY
1	.880 B	.480 B	.390 B	.360 B	7.80 B	19.5	6.03	2.89	3.31	3.81	3.83 B	1.15 B	1
2	.780 B	.400 B	.380 B	.362 B	15.8 B	17.8	5.99	3.00	3.10	3.70	3.76 B	1.18 B	2
3	.760 B	.410 B	.380 B	.360 B	14.8 B	16.5	5.83	4.12	3.01	3.52	3.61 B	1.95 B	3
4	.742 B	.430 B	.380 B	.350 B	12.8 B	15.3	5.85	4.62	2.90	3.35	3.52 B	1.88 B	4
5	.720 B	.420 B	.380 B	.340 B	9.88 B	14.0	5.86	4.96	2.85	3.87	3.89 B	.998 B	5
6	.700 B	.420 B	.370 B	.330 B	11.1 B	12.9	3.86	4.92	2.88	4.01	3.95 B	.958 B	6
7	.680 B	.410 B	.370 B	.320 B	11.9 B	12.8	3.82	5.13	2.87	4.00	3.92 B	.938 B	7
8	.670 B	.410 B	.370 B	.310 B	10.7 B	13.8	3.86	7.09	3.13	4.08	3.91 B	.888 B	8
9	.660 B	.400 B	.370 B	.310 B	10.8 B	12.1	4.10	7.05	3.76	4.01	3.98 B	.898 B	9
10	.650 B	.400 B	.370 B	.310 B	10.8 B	11.2	4.97	7.00	4.83	4.08	3.99 B	.820 B	10
11	.640 B	.400 B	.370 B	.310 B	10.9 B	10.3	4.59	7.73	10.1	4.02	3.98 B	.793 B	11
12	.630 B	.400 B	.370 B	.300 B	20.8 B	10.0	4.99	8.13	11.7	4.20	3.99 B	.760 B	12
13	.620 B	.400 B	.370 B	.330 B	20.8 B	10.2	5.11	7.87	10.8	4.08	3.97 B	.760 B	13
14	.600 B	.400 B	.370 B	.380 B	21.7	10.8	5.70	7.63	11.8	4.38	3.93 B	.720 B	14
15	.590 B	.400 B	.370 B	.350 B	23.3	10.4	5.99	6.77	11.8	4.99	3.91 B	.710 B	15
16	.580 B	.400 B	.370 B	.360 B	41.8	9.72	6.92	6.20	10.7	5.95	3.98 B	.780 B	16
17	.570 B	.400 B	.370 B	.370 B	60.7	8.94	6.58	5.60	10.5	5.79	4.75 B	.690 B	17
18	.560 B	.400 B	.370 B	.390 B	55.8	8.84	6.07	5.10	9.77	5.61	4.60 B	.670 B	18
19	.550 B	.400 B	.370 B	.410 B	61.5	9.99	5.71	4.58	9.38	5.68	4.95 B	.650 B	19
20	.540 B	.400 B	.370 B	.430 B	65.2	10.1	5.06	4.16	8.72	5.34	5.30 B	.638 B	20
21	.580 B	.400 B	.360 B	.520 B	62.8	9.80	5.10	3.60	8.19	5.30	5.09 B	.689 B	21
22	.530 B	.400 B	.360 B	.600 B	52.5	9.98	5.00	3.30	7.81	5.10	5.10 B	.610 B	22
23	.520 B	.400 B	.360 B	.682 B	47.5	9.16	5.02	3.20	7.91	5.08	5.00 B	.600 B	23
24	.510 B	.400 B	.360 B	1.02 B	40.0	7.97	4.99	2.90	7.18	4.84	4.95 B	.590 B	24
25	.500 B	.400 B	.360 B	1.78 B	37.2	7.09	4.18	2.77	6.81	4.82	4.70 B	.588 B	25
26	.490 B	.390 B	.360 B	2.18 B	33.0	6.67	3.70	2.65	6.67	4.63 B	4.05 B	.570 B	26
27	.480 B	.390 B	.360 B	2.12 B	29.0	6.19	3.33	2.71	6.28	4.45 B	4.05 B	.560 B	27
28	.470 B	.390 B	.360 B	2.15 B	28.5	5.77	3.01	3.00	6.09	4.30 B	4.34 B	.550 B	28
29	.460 B		.360 B	2.15 B	25.5	5.60	2.69	3.00	6.03	4.15 B	4.25 B	.560 B	29
30	.450 B		.360 B	1.90 B	23.3	6.58	2.66	3.53	5.90	4.05 B	4.20 B	.530 B	30
31	.450 B		.360 B		21.5		2.61	3.61		3.98 B		.520 B	31
TOTAL	18.000	11.375	11.020	20.790	911.09	317.00	117.84	150.78	209.10	151.62	77.03	83.810	TOTAL
MEAN	.595	.404	.369	.684	30.1	10.6	3.80	4.86	6.97	4.89	2.59	.702	MEAN
DAMS	1990	983	987	2168	60480	27580	10200	13080	18180	13100	6710	1990	DAMS
MAX	.880	.480	.390	2.18	65.2	19.5	6.92	8.13	12.8	5.81	5.30	1.15	MAX
MIN	.450	.390	.360	.310	7.80	8.84	2.61	2.65	2.85	3.81	1.29	.520	MIN

SUMMARY FOR THE MONTH JAN TO DEC
MEAN DISCHARGE, 5.01 M3/S
TOTAL DISCHARGE, 177000 DAMS
MAXIMUM DAILY DISCHARGE,65.2 M3/S ON MAY 29
MINIMUM DAILY DISCHARGE, .310 M3/S ON APR 8

MAXIMUM INSTANTANEOUS DISCHARGE, 66.1 M3/S AT 0001 ON MAY 30

B-ICE CONDITIONS



3.19

STATION NAME: Unnamed Creek near Fort MacKay

STATION NUMBER: 07DA011

LOCATION: Latitude 57°39'31", Longitude 111°31'11", SE 11-100-10-W4

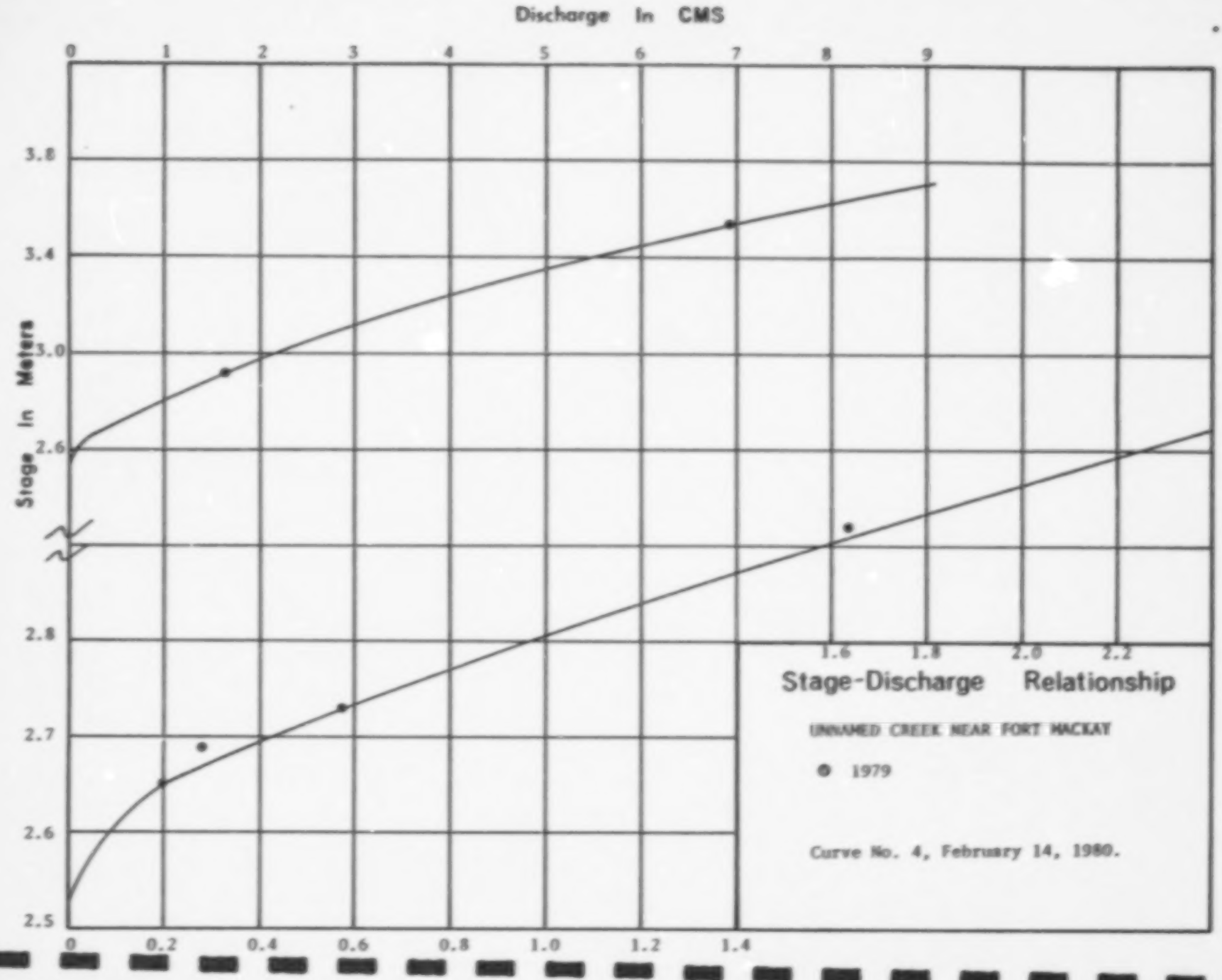
DRAINAGE AREA: 108 square miles (280 km^2)

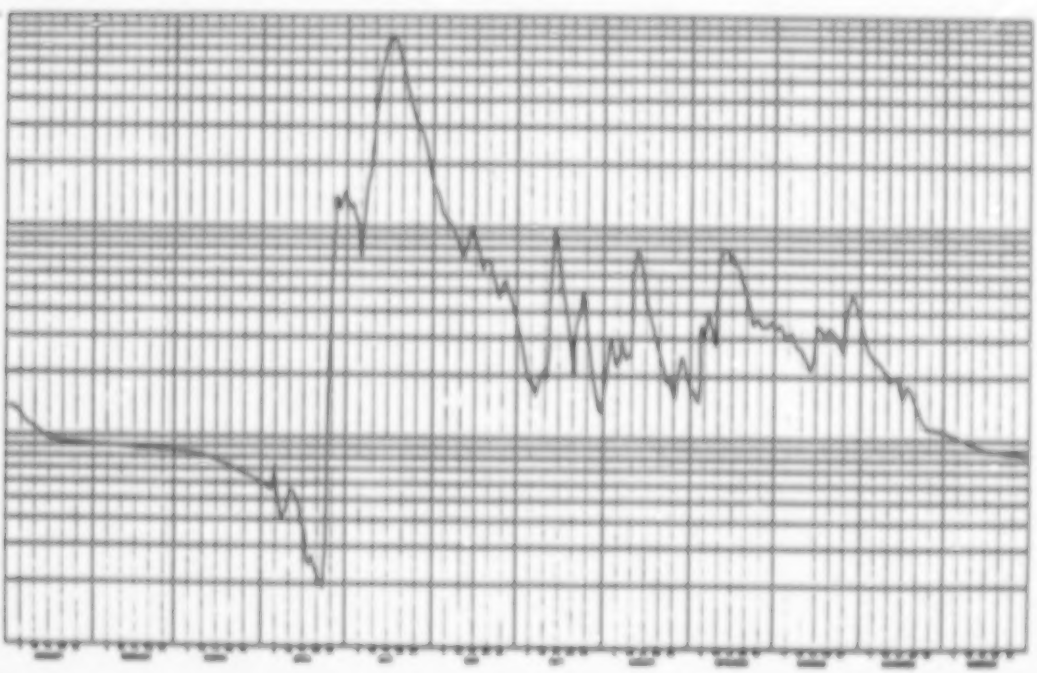
PERIOD OF RECORD: This station was established on July 8 1975. Discharge data are available on a continuous basis from September 1975 to December 1979.

SITE DESCRIPTION: The gauge is located on the left bank immediately below a small unnamed tributary and approximately 34 air miles (55 km) north of Fort MacKay. This station is instrumented with a Stacom manometer linked to a Stevens A-71 water level recorder.

Open water discharge measurements are made by wading or from the cableway immediately above the gauge.

GENERAL: The winter flows at this site have remained higher than expected when compared to other streams in the area. To date they have not fallen below 1.0 cfs (.03 m^3/s). The ice is normally quite thin and bridged and the summer water temperatures are usually cooler than those of neighbouring streams which seems to indicate that it derives a good deal of its flow from groundwater.


Discharge In CMS
0
1
2
3
4
5
6
7
8
9
Stage In Meters
3.8
3.4
3.0
2.6
2.8
2.7
2.6
2.5
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
Stage-Discharge Relationship
UNNAMED CREEK NEAR FORT MACKAY
1979
Curve No. 4, February 14, 1980.



4. LIST OF AOSERP RESEARCH REPORTS

1.		AOSERP First Annual Report, 1975
2.	AF 4.1.1	Walleye and Goldeye Fisheries Investigations in the Peace-Athabasca Delta--1975
3.	HE 1.1.1	Structure of a Traditional Baseline Data System
4.	VE 2.2	A Preliminary Vegetation Survey of the Alberta Oil Sands Environmental Research Program Study Area
5.	HY 3.1	The Evaluation of Wastewaters from an Oil Sand Extraction Plant
6.		Housing for the North--The Stackwall System
7.	AF 3.1.1	A Synopsis of the Physical and Biological Limnology and Fisheries Programs within the Alberta Oil Sands Area
8.	AF 1.2.1	The Impact of Saline Waters upon Freshwater Biota (A Literature Review and Bibliography)
9.	ME 3.3	Preliminary Investigations into the Magnitude of Fog Occurrence and Associated Problems in the Oil Sands Area
10.	HE 2.1	Development of a Research Design Related to Archaeological Studies in the Athabasca Oil Sands Area
11.	AF 2.2.1	Life Cycles of Some Common Aquatic Insects of the Athabasca River, Alberta
12.	ME 1.7	Very High Resolution Meteorological Satellite Study of Oil Sands Weather: "A Feasibility Study"
13.	ME 2.3.1	Plume Dispersion Measurements from an Oil Sands Extraction Plant, March 1976
14.		
15.	ME 3.4	A Climatology of Low Level Air Trajectories in the Alberta Oil Sands Area
16.	ME 1.6	The Feasibility of a Weather Radar near Fort McMurray, Alberta
17.	AF 2.1.1	A Survey of Baseline Levels of Contaminants in Aquatic Biota of the AOSERP Study Area
18.	HY 1.1	Interim Compilation of Stream Gauging Data to December 1976 for the Alberta Oil Sands Environmental Research Program
19.	ME 4.1	Calculations of Annual Averaged Sulphur Dioxide Concentrations at Ground Level in the AOSERP Study Area
20.	HY 3.1.1	Characterization of Organic Constituents in Waters and Wastewaters of the Athabasca Oil Sands Mining Area
21.		AOSERP Second Annual Report, 1976-77
22.		Alberta Oil Sands Environmental Research Program Interim Report to 1978 covering the period April 1975 to November 1978
23.	AF 1.1.2	Acute Lethality of Mine Depressurization Water on Trout Perch and Rainbow Trout
24.	ME 1.5.2	Air System Winter Field Study in the AOSERP Study Area, February 1977.
25.	ME 3.5.1	Review of Pollutant Transformation Processes Relevant to the Alberta Oil Sands Area

26.	AF 4.5.1	Interim Report on an Intensive Study of the Fish Fauna of the Muskeg River Watershed of Northeastern Alberta
27.	ME 1.5.1	Meteorology and Air Quality Winter Field Study in the AOSERP Study Area, March 1976
28.	VE 2.1	Interim Report on a Soils Inventory in the Athabasca Oil Sands Area
29.	ME 2.2	An Inventory System for Atmospheric Emissions in the AOSERP Study Area
30.	ME 2.1	Ambient Air Quality in the AOSERP Study Area, 1977
31.	VE 2.3	Ecological Habitat Mapping of the AOSERP Study Area: Phase I
32.		AOSERP Third Annual Report, 1977-78
33.	TF 1.2	Relationships Between Habitats, Forages, and Carrying Capacity of Moose Range in northern Alberta. Part I: Moose Preferences for Habitat Strata and Forages.
34.	HY 2.4	Heavy Metals in Bottom Sediments of the Mainstem Athabasca River System in the AOSERP Study Area
35.	AF 4.9.1	The Effects of Sedimentation on the Aquatic Biota
36.	AF 4.8.1	Fall Fisheries Investigations in the Athabasca and Clearwater Rivers Upstream of Fort McMurray: Volume I
37.	HE 2.2.2	Community Studies: Fort McMurray, Anzac, Fort MacKay
38.	VE 7.1.1	Techniques for the Control of Small Mammals: A Review
39.	ME 1.0	The Climatology of the Alberta Oil Sands Environmental Research Program Study Area
40.	WS 3.3	Mixing Characteristics of the Athabasca River below Fort McMurray - Winter Conditions
41.	AF 3.5.1	Acute and Chronic Toxicity of Vanadium to Fish
42.	TF 1.1.4	Analysis of Fur Production Records for Registered Traplines in the AOSERP Study Area, 1970-75
43.	TF 6.1	A Socioeconomic Evaluation of the Recreational Fish and Wildlife Resources in Alberta, with Particular Reference to the AOSERP Study Area. Volume I: Summary and Conclusions
44.	VE 3.1	Interim Report on Symptomology and Threshold Levels of Air Pollutant Injury to Vegetation, 1975 to 1978
45.	VE 3.3	Interim Report on Physiology and Mechanisms of Air-Borne Pollutant Injury to Vegetation, 1975 to 1978
46.	VE 3.4	Interim Report on Ecological Benchmarking and Biomonitoring for Detection of Air-Borne Pollutant Effects on Vegetation and Soils, 1975 to 1978.
47.	TF 1.1.1	A Visibility Bias Model for Aerial Surveys for Moose on the AOSERP Study Area
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